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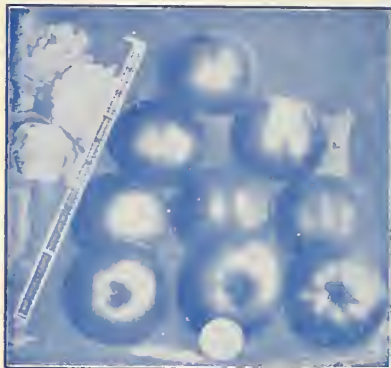
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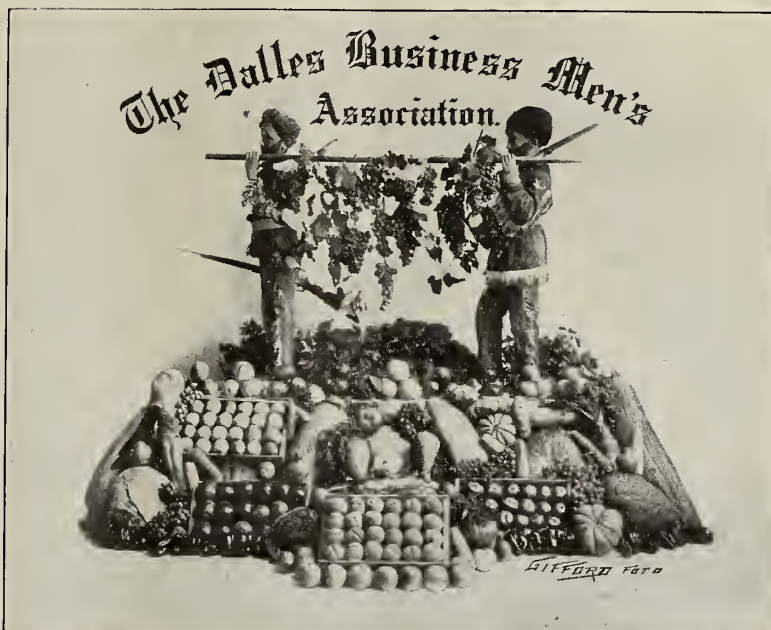
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BETTER FRUIT

A MONTHLY ILLUSTRATED MAGAZINE PUBLISHED IN THE INTEREST
OF UP-TO-DATE AND PROGRESSIVE FRUIT GROWING AND MARKETING

POINTS ON THE MANAGEMENT OF AN ORCHARD

BY C. I. LEWIS AND W. H. WICKS OF THE OREGON AGRICULTURAL EXPERIMENT STATION

THIS bulletin, entitled "Orchard Management," is not intended to put forth and explain some new and wonderful discovery or achievement in the domain of horticulture, but rather to thoroughly explain the management of important fruits and assist the large class of deserving people who are now beginning to realize and appreciate the value of fruit-growing as a sound, lucrative occupation.

The fruit industry is rapidly enlarging and becoming of great importance throughout the Pacific Northwest and more particularly the fertile State of Oregon. Although the price of our various fruits and particularly apples is not as high as that which Mr. Leuelling received for his first apples which he sold in Portland in the early 50s, yet nevertheless there is a neat profit in raising fruit at the present prices.

Almost ninety-five per cent of those people who have just begun or intend to begin raising fruit in this state are those who are leaving their original profession. Consequently, we are receiving letters of inquiry at the experiment station from men who know not the first principles of fruit-growing, and those with the rest of the industrious people of the state are the ones this treatise is intended to assist. The questions asked are so various that it is thought best to answer them by printing a general simple bulletin that everyone can understand, and it is hoped it will fulfill the apparent need.

The word orchard is very broad in its meaning and will admit of further explanation. By orchard we mean a group of trees planted and cultivated for their fruit. Thus, we have an apple, peach, plum and pear orchard and any other combinations of fruit-producing trees that may be grown. This work will treat of pomaceous fruits, such as the apple and pear.

LOCATION AND SITE

Location—The question of location is difficult to answer, but a few remarks will serve as a guide. Bear in mind when choosing a location that the nearer the market the better, providing other things are equal, and secure several means of shipping if possible. If fruit is grown in small quantities and for fancy trade, it is better to be close to the market, but if it is grown on a large scale for commercial purposes it may be grown further from the market, as our present day methods of transportation have overcome distance, but locate as near as possible to shipping points. The cost of land must not be too important in choosing a location if it will produce profitable results. In order to grow the best fruits, you must choose those that will thrive best under the conditions of the locality. Facility of tillage and climatic conditions are very important. To sum up briefly the subject of location, choose a fertile

soil which should be deep, well drained and good body or texture, near two or more shipping points, and a suitable climate.

SITE

As to Soil—The site of the orchard is an important question and is governed by conditions that prevail in certain localities. The following points must be

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SOME BENEFITS AND PURPOSES OF COVER CROPS

A FEW OBSERVATIONS ON THE FINANCIAL FLURRY

observed: Texture and kind of soil, supply of soil moisture or facility to irrigate, air and soil drainage, wind-breaks, direction of slopes and distance from large woods.

The above terms will need more explanation before they are of any practical value to the man who is not acquainted with agriculture. There are many kinds of soil and our various fruits prefer their respective soils. We know that the apple likes a well-drained, deep, rich soil, while the pear prefers a more heavy clay loam, but likes to be well drained. The peach does best in a well-drained gravelly or decomposing rocky soil with a deep sub-soil. In choosing land be sure not to have an ideal soil in one part of your orchard and a hardpan or impervious strata in another. If the soil is not rich, deep and satisfactory in every way, do not purchase it.

Soil moisture requires further explanation, but will receive more under the subject of "soil." The air drainage of an orchard is very important, as it relates to frost. The cold air settles in the valleys and low places and if the orchard is in the warmer and circulating strata of air it will often escape dangerous frosts. Water gives up its heat slower than the earth and orchards that are near it will be more or less protected from cold. The subject of soil drainage will be treated under its proper heading later.

Wind-breaks have proven exceedingly useful and there are many points in their

favor, yet there are those who do not think favorably of them. Figure 1 shows conclusively the need of an ordinary wind-break that can be obtained by planting any of our native conifers. Some very good reasons for a wind-break may be stated thus: It protects from cold, reduces evaporation of the soil, prevents breaking of trees by wind, lessens wind-falls, protects blossoms, retains the loose surface soil and is a home for beneficial birds. There are some objections to the windbreak, which it is necessary to know in order to place it in its proper relation to the orchard. If the fruit trees are too near it, the fruit will be poor in color and generally covered with rust and more or less infected with insects. For warm, strong winds use poplar, maple, etc.; for cold winds the conifers, such as fir and spruce; seedling fruit trees, as Figure 2, may be used, but must be kept sprayed. The alder and several other of our native trees furnish food for the tent caterpillar and several diseases. The more our natural forests are cleared away the more necessary it will be to plant wind-breaks. We cannot change or control atmospheric conditions, but we can moderate them to a certain degree. Figure 2 shows an effective, economical wind-break of apple, plum and quince seedlings.

As to Aspect—The exposure or aspect is determined by the direction and slope of the land. The temperature of the soil and air is greatly influenced by the aspect and is a direct factor in growing the tender and early blooming varieties. If possible select a site that has a natural soil and air drainage. Excess of cold air and soil moisture must be carried from the orchard. The need of air drainage is apparent if we go from the top of a small hill to the valley and notice the difference in temperature. The colder air always settles in the low places, and consequently frost is more frequent. If you are to grow fruits that blossom early and must be protected from late frost, then a northern aspect is much to be preferred, but always remember a southern aspect is much better, providing late frosts will not affect your locality. Those varieties that take on high color must be planted where they will receive the most sun. Always avoid small valleys with a creek running through, as cold air will accumulate in such places, and frost will do considerable injury, but large bodies of water are beneficial.

"Deep valleys with small streams of water are the worst situations for fruit trees, as the cold air settles down in these valleys on a calm frosty night, and buds and blossoms are very frequently destroyed. We know a rich and fertile valley of this kind in Connecticut where the cherry will scarcely grow and a crop of apples or pears is not obtained once in ten years, while the adjacent hilltops and high country a couple or three miles distant yield

abundant crops annually."—Downing's Fruits and Fruit Trees of America.

SOIL

The soil must have a good supply of humus and if possible some cover crop growing on it to be turned under. We must keep the land at work and not allow it to be idle, as was the general opinion a few years ago.

The amount of plant food which mature fruit trees in the full vigor of bearing use in one growing season has been reported by L. L. Van Slyke, O. M. Taylor and W. H. Andrews of the New York State Station. The apple trees in

diseases of various kinds. Fruit on such a soil is large, of good keeping quality, and in our climate of fine color. Fruit on lighter soil is generally smaller, of higher color, poorer keeping quality, maturing sooner but producing fruit of fine flavor and aroma.

A gravelly loam is a soil that contains gravel but not in excess. A strong loam is a soil that is rich and contains just enough sand to make it loose and easily worked. Clay loam is usually a strong and deep soil and contains just enough clay to make it more or less difficult to work. It is best to choose a soil rich in

water table or level falls and the plants, owing to a poor root growth, suffer in time of drought. It deepens the soil and makes the capillary action greater, while it increases the amount of plant food by causing a larger amount of soil to give up its food when penetrated by the roots of plants. The lower the water table the more surface will the plants be able to utilize, as nitrification and those changes which unlock stored plant food take place in well ventilated soil. The physical condition of the soil is greatly improved by aiding and facilitating chemical changes. The soil is made much warmer by the removal of surplus water, and the increased temperature has a beneficial influence on plant growth. Those small bacteria which are so important are able to do much more and faster work in soil which is well drained.

William P. Brooks, in his book entitled "Soils and How to Treat Them."

"Among the principal benefits which follow the drainage of soils needing it may be mentioned the following: It deepens the soil, promotes aeration, makes manures more effective, warms the soil, lengthens the season both for plant growth and for work, makes all tillage operations easier and improves the tilth, reduces the liability to injury of crops from drought, promotes the better germination of seeds, results in the production of larger crops of better quality and decreases the risk of failure of crops, reduces the amount of surface wash, makes it possible to haul heavy loads over the field, produces better sanitary conditions, and decreases the number of mosquitoes and malarial diseases. Thorough drainage and thorough tillage are the main points in land improvement."

Land That Requires Drainage—There are several kinds of land which need drainage, but it can safely be stated that a large percentage of land in Oregon would be benefited by a system of drainage, and much of our so-called white land could be reclaimed if the surplus water was carried off and the land cultivated properly.

Land that is overflowed frequently by our creeks and rivers needs a thorough



FIGURE 1—Windbreak greatly needed. Only by the most judicious pruning can these trees be balanced, and then only with great difficulty. Staking would have helped many of them.

the experiment yielded during the season from twenty-three to nearly thirty bushels of fruit each, the pear trees from one to five bushels each, the plum from one to one and three-fourths bushels each, and the quince trees about fifteen bushels.

Variety.	Lbs. Nitrogen.	Lbs. Phosph'c Acid.	Lbs. Potash.	Lbs. Lime.	Lbs. Magnesia.
Apple	1.46	.39	1.57	1.62	.66
Peach . . . . .	.62	.15	.66	.95	.29
Pear . . . . .	.25	.06	.27	.32	.09
Plum . . . . .	.25	.07	.32	.34	.11
Quince . . . . .	.19	.06	.24	.27	.08

In our climate most all fruit trees will thrive and produce some fruit, but as before stated, each fruit prefers its own peculiar soil. The soil best adapted to general fruit culture may be classed or divided into gravelly loam, sandy loam, strong black loam and clay loam. Very light, sandy soil, wet swamp or peat soil or dry sand are generally to be avoided, although there are exceptions. For instance, in some neighborhoods we find a large area of light, sandy loam which the observer would not consider good apple land. This land has been filled in by previous overflows of a river, but this soil produces fruit of the finest qualities. Investigation shows the reason. The soil is deep and mellow, from fifteen to twenty feet when the water table is reached, thus supplying abundance of water. This soil is unexcelled for cultivation purposes as it can be worked while other soils are sticky and heavy. The hardier fruits usually do best on a rich, moderately heavy clay loam, and experience has shown that the apple, pear, and plum do much better on such a soil and are much more immune from

calcareous substances if the texture is good. The small fruits require rich soil and will do well almost on any soil that will produce first-class farm crops.

Preparation—The first thing to do is to have the soil in a good state of cultivation so that it can give up its plant food when applied or that which it already contains. The soil should be tile drained if not naturally, thoroughly fertilized, properly subsoiled and put in the best shape possible before any trees are planted. If the soil is deep, the trees will go deep into it, and the root system will be out of the way of the plow. The manures should be incorporated in the soil immediately, and must be placed where the rootlets can use it and not piled high about the trunks of the trees after they are planted.

DRAINAGE

Function—The functions of drainage are many, but the following will give some of the most important reasons why land should be drained. Drainage removes the injurious salts in the earth which would accumulate in the soil with no natural or artificial drain. It removes water at those times when a surplus would be very injurious to plant life by excluding sufficient air. In our rainy season the surplus water must be carried off. In contrast to this, drainage enables the soil to hold more moisture in those times when it is most needed by the plants. In soils poorly drained the water table is near the surface in the early part of the season, and hence the plants make a lateral shallow root growth. Later, when rains become less frequent, the



FIGURE 4 Common method of budding.

system of under-drainage; also flat land with a heavy subsoil. Most land at the foot of hills is subject to ooze water and the overflow of springs, etc., and hence will be much benefited by drainage. In the rainy season here may be seen land where the water table is visible above the surface, and it can be readily seen that such land needs drainage. Any land that will not shed its surplus water in forty-eight hours after heavy rains needs drainage badly.

Its Effect on Plants—Seeds often decay in poorly drained soil, and those that do succeed in germination have very unfavorable conditions to contend with. A fair amount of moisture, air and favorable temperature are needed for plant growth. A certain amount of water is necessary in the soil, it must be understood, but the amount above what the plants require must be carried off. The food of plants is in solution and water is the medium in which it is carried from the crude state to the usual form.

The soil particles are made much smaller by drainage, and thus the small, delicate root-hairs are enabled to pass among them and secure more food. The tips of roots and root-hairs are acid and have the power of unlocking plant food in the soil and oxygen in sufficient amount is required among the particles in order for the rootlets to carry on their work. Crops are also of better quality and the valuable constituents are increased. Among the most valuable ingredients may be mentioned starch, albuminoids and sugar. It must be remembered that all conditions support their respective plant life, i. e., water-logged soil will support water-loving plants, and a well drained soil will produce the more valuable ones.

Method of Drainage—There are several ways of draining a field, but the under-drain is the only method to use in soil used for horticultural purposes. The surface drains may serve temporarily in some conditions, but they are inferior to the under-drains. All sorts of drains have been used in the past, but experience has proven that the tile drain is the best. Some of the other kinds are brush, cement, wood, stone and brick.

The distance between drains is governed entirely by the kind of soil and the position of the same. If the soil is more or less loose and friable, the drains may be from twenty to forty feet apart and be quite satisfactory. They will do better work if placed much closer in

heavy impervious soils. The depth to which they are placed depends upon the outlet, the slope of the land to be drained and the general conditions of the soil. The depth of the drains will govern the distance apart to which they are placed. The deeper the tile, the farther apart they may be placed, providing the soil is porous and will admit the water to the drain. From four to five and one-half feet is none too deep for best results, and the deeper the water table the better for the trees. The drains should be, in all cases where possible, deep enough to escape being misplaced by tools, and in severe climates, by frosts. The size of the tile is an important consideration in putting in a system of drain.

Wheeler says: "If the fall be six inches in one hundred feet, the two-inch main will carry water from three acres, and with a fall of

twelve inches in one hundred feet it will carry the water of double the above named area. Also for the more open soils, a four-inch main would carry the water from five acres, a six-inch main the water from twelve acres, and an eight-inch main the water from twenty acres, provided the fall is from three to four inches in every hundred feet. If the fall is six inches, the different sizes will carry the water from one and one-half times the above named areas. In clay soils the number of acres for the different sizes at different grades will be double those above named."

It is never wise to use larger tile than necessary. The outlet of the main drain is an important point. Much depends upon into what the main empties, but a solid, substantial support is forcibly recommended. Otherwise the terminal joints become misplaced and eventually the whole system is obstructed. If the outlet is in a stream where the water flows against it with any considerable force, build your bulkhead at such an angle so the water of the stream will not wash in back of it and eventually carry it out. In conclusion, tile should be properly laid and all work done well.

CULTIVATION

This is performed to better the mechanical condition and increase plant food. Tillage of the

soil in the orchard is to increase chemical changes. Every orchardist has his method of cultivation. The most general practice is to plow about the time the blossoms fall, or as soon as conditions are suitable, and then follow with a clod crusher or disc harrow. The soil should afterwards be kept in a fine dust mulch three or four inches deep all summer. This is very instrumental in saving soil moisture. The tools most commonly used by the best fruit growers are as follows: Eighteen-inch disc, smoothing harrow, leveler, clod smasher, spring tooth or acme harrow, Kimball orchard



FIGURE 3—Permissible in a young orchard, but the crop is somewhat too heavy. Never grow grains, but garden truck may be grown if necessary.

weeder, a home-made weeder to cultivate near the tree trunks, and a good plow.

It is far better to have a small piece of land and keep it under high cultivation than to poorly care for a larger area. The people in this state should dispose of a portion of their large farms and improve their method of cultivating the smaller amount. The value of cultivation throughout the dry season will be more appreciated if explained in detail. Suppose you place in a pan of water the end of a large glass tube and notice the rise of the water in the same. The operator will notice that the water does not rise to any great extent. Then place in the same pan of water a very small tube in the same manner as the larger and notice the rise of water. This, then, is the same principle as that in the soil, that of capillary attraction. The finer the ground is made, the smaller and more numerous are the capillary tubes, and thus the more moisture is carried upward from the water table. The cultivation should not be continued too late in the season, as it will induce a late growth of the trees. Cultivation should stop in late summer or early fall, and the land be sown with vetch, clover, rape, turnip or some such plants as a cover crop, and turned under in the spring.

COVER CROPS

Cover crops are coming more into favor in this state. Many soils are losing their humus, through continued working and producing, and the cover crop is the ideal thing to restore them to their former condition. Before sowing a cover crop, determine what results certain plants will bring about. If your trees need nitrogen they will show it by having light green small foliage and a small wood growth. The best cover crop in this case would be any one of the leguminous plants—preferably vetch. If



FIGURE 2—Effective economical windbreak. A windbreak may be grown with very little trouble and expense. This windbreak takes very little room and does not take much nourishment from the soil.

your fruit lacks color add potash, sow turnips or rape, and if your soil needs some of the surplus water carried away, sow those plants that evaporate the greatest amount. The cover crop should be plowed in before it becomes too abundant, as too much green vegetation does not decay rapidly and tends to dry out the soil.

What a Cover Crop Will Do—A cover crop will catch in the fall the nitrates and other valuable plant food which would otherwise be lost in the drainage system and hold it over until the following spring for the use of the trees. It also catches the nitrates in the spring, which are apt to leech out, and takes up the excess water, and thereby puts the ground in condition for cultivation sooner. The humus loosens the soil particles which in turn increases its water capacity. Humus is essential for the growth of the beneficial bacteria of the soil. One of the most important parts that a cover crop plays is its ability to change chemically the compounds in the soil and put them in an available form for the trees. The cover crop gathers, digests and turns over to the trees the plant food which it has stored. The rotation of cover crops is earnestly advised. This is exceedingly important and must be practiced in order to furnish the trees with a balanced ration. When to change the crop will depend upon what the trees lack, as some orchards need more potash than nitrogen

and vice versa. Some orchards will need only the humus supplied and this is best furnished by rye. In all uses of a cover crop make it do a definite work. Never pasture the cover crop in the orchard, as the soil is usually too wet to allow stock upon it, and the trees will gladly appreciate all the food they can obtain. Some argue that feeding the cover crop is profitable, but it is not half so valuable as first-class apples at \$3 to \$4 per box.

FERTILIZATION

The fertility of the soil depends upon so many things that it is very difficult to tell just what fertilizers to add, but it

they require. If the sod method is chosen for a period of years, always mow the grass and leave it upon the soil, instead of putting it into the barn for hay. After the sod has served its purpose break it up and practice the most needed method. The sod method should never be used in a young orchard. The young trees need all the food possible and good care during the first years of their existence, is absolutely essential. The growth of vegetables is permissible during the early life of the trees, but if the trees require all the food, it is of course best not to use their supply by

growing other plants (See Figure 3). In conclusion, the orchardist cannot be too strongly impressed with the importance of cultivating his young trees in the most careful manner and always give them their first choice and under good cultivation. It is observed that no orchard under good cultivation is abandoned, while those in sod are often uncared for.

IRRIGATION

One of the most serious problems we have to solve at the present

time in our semi-arid fruit districts is that of irrigation. At present many growers are meeting this problem blindly and believe that irrigation is the only practice that can guarantee them a full crop of large apples, the size being all gain and nothing being sacrificed in return. They fail to make a close study



FIGURE 9—Correct planting. The properly planted orchard should look like this. These trees show beautiful symmetry and good care.

must be borne in mind that poor crops in nine times out of ten are due to poor mechanical condition, instead of lack of plant food. Many of our valley soils are rich in plant food and it remains for the tiller to put it in available form. If the soil is a heavy clay loam and allowed to become puddled and kept too wet, we can readily see that its mechanical condition is to blame, if it produces nothing, no matter how much plant food it contains. If the soil is deficient in any one plant food, it is almost sure to be nitrogen. This most valuable food can be added in several artificial ways—in the form of nitrates—but there are certain minute organisms that will use the free nitrogen of the air if the condition of the soil is such that they can live. The salts of nitrogen are rapidly leached out of the soil in this climate, due to a large annual rainfall. Plants use nitrogen in large quantities.

Fertilizers should be applied early or in time to help the natural growth of the orchard, and not applied so late as to cause the trees to make a late or second growth. Do not think that you must be always adding commercial fertilizers to your orchard land, but rather improve the mechanical condition, and unlock the stored-up food already in the soil.

Sod Culture—This treatment may be used to great advantage in some cases. Under certain conditions where the soil is exceedingly rich, moist, and the trees are making too rampant a wood growth, the sod method may be used to great advantage for checking the same. Under very few conditions can sod culture be recommended for the permanent method. The orchardist must study his trees and determine what method of cultivation



FIGURE 6—Cleft grafting. No. 1, scion inserted ready for waxing. No. 2, end view of No. 1 to show position of scion. No. 3, No. 1 waxed. Be sure to thoroughly cover the wound. All things considered, the best method of top working.



FIGURE 5—1, 2, 3 desirable scions, 4 and 5 undesirable; 4 terminal growth, and 5 water sprout. The last two should never be used.

of their conditions, and because a certain fellow fruit grower who irrigates obtains wonderful results they immediately accept the general principles without realizing or studying their relation to their own conditions. Before irrigating on a large scale be sure you need it. Many times more thorough cultivation is what is needed; if you do irrigate remember that the problems concerned with irrigating your fruit are vastly different from those connected with cereals, forage crops, or garden truck. You must know how much water to apply, when to apply, and the action of water on tree, fruit and soil. It takes less water if it is added in the form of one or two good applications, thoroughly wetting the soil, than if added a great number of times but in small amounts. Again, if applied, say mostly in July, better all around results are obtained. At times one would be justified in adding water in the fall, but not as a general practice. Whenever irrigation is resorted to it should be followed by thorough cultivation. In certain locations, like Rogue River and Hood River, we find just as fine fruit grown without irrigation as with it, although certain areas doubtless would be benefited by irrigation. The problems in these localities will be largely a financial one, and whether irrigation, with a moderate amount of cultivation, is cheaper than very intense cultivation. In the Grand Ronde Valley young orchards, up to the time of heavy bearing, seem to do very well without any irrigation, but heavy bearing orchards seem to need several irrigations in order to mature a heavy

crop of large apples. In the Willamette Valley cultivation is all that is needed.

There are a good many systems of irrigation in vogue. The one most commonly used is to plow a ditch on each side of the rows of trees. But, whatever the system used, the aim should be to allow for as even a distribution of water as possible. In regard to the kind of water used, we find well, river, spring and artesian water. Where the two latter are used it is a good plan to have the water analyzed to determine whether or not it contains injurious salts. One grower in Southern Oregon collects the

when the trees are attacked by blight they succumb very rapidly. Especial care should be used also in irrigating the cherry and peach not to produce too rapid and soft growth. In short, you must study the action on the different fruits.

On moderate heavy loams we find we can grow apples that keep longer than on light loams where apples naturally mature more rapidly and consequently have a shorter life. This fact has led some to conclude that the irrigated apple is a superior keeper. On the contrary, where fruit is heavily irrigated, we find

that size is gained, but flavor, aroma, keeping and shipping qualities are sacrificed. Especially is this true with pears and peaches. Now, as a state, we have earned a reputation for producing fruit of quality, fruit of unrivaled flavor, of unsurpassed color, and keeping and shipping qualities, and we should guard this reputation jealously.

The action of irrigation on the soil should be closely studied, from both the chemical and the physical standpoint. The nature of the soil must determine to a very large degree the methods to be employed. You must solve this problem largely to yourself. While the principles are the same, the application of them will be very different under various conditions. If we can increase the net returns

of our orchards and not sacrifice any of our reputation, then by all means irrigate; but be sure of your position.

PROPAGATION

The propagation of the pomaceous fruits must depend upon the development of seeds, buds or scions. Subjected



FIGURE 12—Close planting. Trees eight years old and too close to admit proper care. Thirty-six feet is none too far apart.

drainage water in a reservoir, where it is pumped by a gasoline engine into a large tank and from that sent over the fields. The leakage from the tank is pumped by a ram to the farm buildings. Wherever land is irrigated it should be well underdrained, thus preventing the accumulation of injurious salts or acids.

Irrigation has a tendency to prolong the growing season, at times producing a secondary growth. We have at this date, December 12, two apple trees which still have nearly their full leafage. These were irrigated heavily, while the surrounding trees were not. These latter long ago entered the rest period. Whenever this practice of late irrigation is employed the twigs and buds do not seem to harden properly and in case of a hard freeze they are liable to be injured and the result will be a light apple crop. A case of this kind happened the past season. It is sometimes given as an argument in favor of irrigation that in the mountainous states and in some of the states like Minnesota, where the land has been heavily irrigated, or where it is naturally moist and heavy, that apple trees do not suffer as much. Whereas, on dryer land, the trees are often killed. This doubtless is true. The presence of moisture in the soil tends to absorb much of the frost, while in dry soil the tree is obliged to receive it. But this has little to do with hardening buds in our climate. The very fact that the trees retain their leaves is in itself an indication of a forced soft growth and energy expended in these lines that would be better exerted in hardening wood and bud. Often where pears are irrigated it produces a very rapid soft growth and



FIGURE 7—A stock of this size cannot support two scions. One would have made a strong union.



FIGURE 8—Result of two scions on a small stock. The stock is decayed in the center. Practically lost. One scion would have prevented this.

to circumstances favorable for growth, the bud or graft will make as sturdy a tree as the seedling. Budding and grafting are employed in all our propagation of the better class of fruit, as this method is the only way to multiply the variety true to type. It never pays to propagate by seeds unless you are looking for a new variety or wish stocks for budding. The common and best method for securing trees is budding in late summer while the sap is still active. These buds are inserted on well formed young stocks and are far superior to the root-grafted tree. (See Figure 4). When it is thought desirable to grow apple stocks at home, the seed should be sown in the fall in strong land that has been very deeply cultivated. Seldom ever is it profitable to bother with apple seed, as nice young trees of any variety can be obtained from any of the various nurseries in the state at a very reasonable cost.

Many of the difficulties met with in fruit culture, as maladies of various kinds, unfruitfulness, and so forth, are induced by a careless and indiscriminating method of propagation.

The stock has a most important influence on the health and longevity of the tree and should therefore be propagated and selected with due regard to its soundness, vigor and hardness of constitution. In all propagation use only the best material. The scions should be only from the ends of bearing branches and of the previous year's growth. Do not use suckers or water sprouts of any

kind. (See Figures 5 and 6). Select only that which shows vigor, constitution and that which meets your requirements.

The one essential thing in budding and grafting is to bring the cambium layer or inner bark of the stock and scion in perfect contact. The whole process is very simple, but it is best to secure the services of an experienced workman if you do not understand the process. It is best to do grafting in the spring. There are many methods of grafting, but only a few are in common use or of any practical value. (See Figure 6). Grafting is employed

the tap root to go deep into the soil and thereby be hardier under severe conditions. The root system must be judiciously formed. The tap root may be cut off to a certain degree, but cut back all the root system equally. All mangled and bruised roots must be removed, and remember where a smooth, clean cut is made several new rootlets will issue. It is readily seen, then, that a moderate root pruning is beneficial. The top should be cut back in proportion to the roots. A yearling tree should be cut off about forty inches from the ground, and the lower limbs started from eighteen to twenty inches

from the soil. A two-year-old tree should have its branches cut back from one-half to one-third of their length and all cross limbs cut out. When a tree is taken out of the nursery row a large portion of its root system is left in the soil. The balance between the roots and the top is thus destroyed and pruning must be resorted to in order to re-establish the equilibrium. Nearly all of the elements which build up a tree are taken from the soil in a liquid form

and carried to the leaves of the tree and worked into a suitable form for its use. This shows how important the roots are to the plant. We find people who advocate the Stringfellow method of root pruning and planting, but there are very few places and conditions where it will be of value. In a long growing period and rich soil the trees may adjust themselves, but who would ask better growth of an orchard when our present method of cultivation and handling are carried out properly. Trees in this state come into bearing plenty soon enough for their own good. Young trees should not be permitted to bear heavily until they are from six to eight years of age.

Where to Purchase—The buyer must secure his goods where the best can be



FIGURE 15—These trees have been started low and are easy to take care of. The proper height for this state. Soil mulch is ideal. Low-headed trees and large financial returns are synonymous when given good care.

for top working while budding is employed for multiplying the variety. (See Figures 7, 8 and 9).

TREES

Under this head we will first take up the importance of care in selecting the stock. The nurserymen sow the apple seed in rows and when these have attained the proper size, desirable varieties are worked on to the seedling stock.

The best method of securing your trees is to take scions from trees of well known characteristics and habits in the vicinity in which you wish to plant and send them to the nurseryman for him to work the same on suitable stock for you. (See Figure 4). The trees that are

one year old from the bud or graft are the most desirable, as they are then in a state to be properly trained. The reasons for buying one-year-old trees are this: The root system is not so badly damaged in transplanting, the tree has not grown crooked, it can be started to suit the grower and is not so liable to die when transplanted as the older trees. Some nurserymen practice cutting off the tap root, which makes the tree handle better, and this is considered a good practice to a certain extent, but the tree needs



FIGURE 16—These trees are practically out of reach and valueless. Result of close planting and poor pruning.

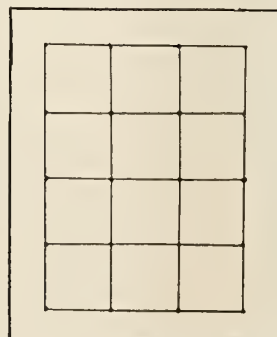


FIGURE 10—Square or opposite plan. Not so good as Figure 11. 1 10 20 30 40 50 100 ft.

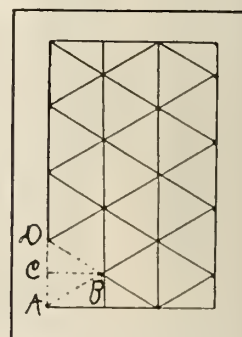


FIGURE 11—Hexagonal plan. More trees to the acre than by square plan.

obtained with honest dealing. We heartily advocate buying trees from our home nurseries; the trees are acclimated, the temperature is mild and the trees escape severe conditions. Always patronize home industry if possible. It should be remembered that nursery stock should never be purchased just because it is cheap. If possible go direct to the nursery and choose the trees for yourself. The large sized trees are not always the most desirable, but rather choose a medium size, vigorous, straight, stocky tree of a firm, hard growth and free from disease. Crown-gall and woolly-aphis are the worst pests on young trees, also green aphids. An orchard planted with infected trees will never be of any value. The tendency is to buy trees too old rather than too young.

When the trees arrive they should be immediately unpacked and heeled in. The heeling-in process is very simple; a trench is dug deep enough to accommodate the roots nicely, and the trees are placed with their tops facing the south. The time to purchase your trees is in the fall for this climate. Assuming the time has arrived for you to buy, the next and exceedingly important subject is the kind to buy.

WHAT VARIETIES SHALL I PLANT?

There is no more important question connected with the industry and more often asked by fruit growers. The ordinary fruit grower has not time to test varieties and this should be done by our various experiment stations. It is also very difficult for an experiment station to tell what varieties will succeed best on every man's farm in the state, but the behavior of varieties on the station grounds will give sufficient knowledge to limit the varieties to certain localities.

The following list of fruits which are adapted to certain localities of the state will serve to answer "What varieties shall I plant?" and is intended to be of value to the prospective fruit grower in

this state. The state is divided into five horticultural districts and each one supports a commissioner. The following is a complete list of the suitable varieties to plant:

FIRST DISTRICT

Apples—Red Astrachan, Early Harvest, Yellow Transparent, Duchess, King, Gravenstein, Wealthy, Fameuse, Spitzenberg, Yellow Newtown, Baldwin, Jonathan, Gano, Northern Spy, Red Cheek, Pippin, Winesap and Russet.

Pears—Bartlett, Bonne de Jersey, Angouleme, Fall Butter, Clairgeau, Seckel, Idaho and Winter Bartlett.

Cherries—Royal Anne, Bing, Lambert, Black Tartarian, Kentish, May Duke, Major Francis and Black Republican.



FIGURE 13—Never start the main limbs in this manner. They should issue in a whorl from eight to fourteen inches apart to prevent a bad crotch.

Plums—Green Gage, Reine Claude, Peach Plum, Yellow Egg, Blue Damsen, Washington and Bradshaw.

Prunes—Italian, Petite, Silver and Hungarian. Peaches—Alexander, Hale's Early, Early Crawford, Late Crawford, Salway and Elberta.

Grapes—Concord, Worden, Niagara, Moore's Early and Delaware.

Strawberries—Albany, Wilson, Clark's Seedling, Sharples, Magoon and Excelsior.

Raspberries—Cuthbert, Marlboro, Gregg and Cumberland.

Blackberries—Lawton, Taylor and Kittatinny.

Currants—Fay, Cherry and White Grape.

Gooseberries—Champion and Downing.

SECOND DISTRICT

Apples—Yellow Transparent, Early Harvest, Red Astrachan, King, Gravenstein, Wealthy, Fameuse, Duchess, Yellow Newtown, Jonathan, Baldwin, Winesap and Babbitt.

Pears—Bartlett, Seckel, Clairgeau, Bosc, Comice, Winter Nelis and Idaho.

Cherries—Royal Anne, Lambert, Bing, May Duke, Black Republican, Black Tartarian, Waterhouse, Elton and Willamette.

Plums—Reine Claude, Willamette, Bradshaw, Peach Plum and Brignole.

Prunes—Italian, Petite, Silver and Hungarian. Peaches—Early Crawford, Late Crawford and Foster.

Grapes—Concord, Delaware, Worden and Moore's Early.

Strawberries—Magoon, Clark's Seedling and Wilson.

Raspberries—Cuthbert and Marlboro.

Blackberries—Lawton and Kittatinny.

Currants—Cherry and Fay.

Gooseberries—Downing and others.

THIRD DISTRICT

Apples—Gravenstein, Spitzenberg, Yellow Newtown and Jonathan.*

Pears—Bartlett, Comice, Bosc, Anjou and Winter Nelis.

Cherries—Bing, Royal Anne and Black Republican.

Plums—Washington, Coe's Golden Drop and Yellow Egg.

Prunes—Italian and Petite.

Peaches—Alexander, Hale's Early, Early Crawford, Globe, Muir, Cling and Salway.

Grapes—Concord, Moore's Early, Moore's Diamond, Worden and Eaton. American varieties—

Tokay, Rose of Peru, Black Prince, Black Hamburg, Malago, White Muscat, Golden Queen, Thompson's Seedless.

Strawberries—Magoon, Brandywine, Haverland, Jessie, Sharpless and Marshall.

Raspberries—Cuthbert, Gregg and Mammoth Cluster.

Blackberries—Lawton, Kittatinny and Mammoth.

Currants—Cherry and Fay.

Gooseberries—Downing, Oregon Champion and Industry.

FOURTH DISTRICT

Apples—Red Astrachan, Gravenstein, Yellow Transparent, King, Duchess, Yellow Newtown, Baldwin, Northern Spy, Wagener, Winter Banana, Hyde-King, Red Cheek Pippin, Jonathan, Winesap and Spitzenberg.

Pears—Bartlett, Anjou, Buerre Easter, Winter Nelis, Flemish Beauty and Comice.

Cherries—Black Tartarian, Lambert, Black Republican, Royal Anne, Bing and Early Richmond.

Plums—Abundance, Prunus Simoni, Peach, Columbia, and Yellow Egg.

Prunes—Hungarian, Italian, Petite, Silver and Tragedy.

Peaches—Alexander, Elberta, Foster, Weber's Prize, Early Crawford, Late Crawford, Lemon Cling, Early Charlotte, Hale's Early and Salway.

Grapes—Black Hamburg, Muscat, Black July, Rose of Peru, White Sweetwater, Muscatella and Tokay.

Strawberries—Clark's Seedling.

Raspberries—Cuthbert and Gregg.

Blackberries—Kittatinny, Lawton, Snyder and Mammoth.

Currants—Cherry, Fay and White Grape.

Gooseberries—Champion and Red Jacket.

FIFTH DISTRICT

Apples—Rome Beauty, Jonathan, Gano, York Imperial, King and Spitzenberg.

Pears—Bartlett, Clapp's Favorite, Arjou and Buerre Easter.

Cherries—Bing, Royal Anne and Lambert.

Prunes—Italian and Hungarian.

Peaches—Early Crawford, Elberta, Globe and all early varieties.

Grapes—Concord, Worden and Sweetwater.

Strawberries—Clark's Seedling, Sharpless and Magoon.

Currants—Fay.

Gooseberries—Industry.

*None others should be considered.

The Spitzenberg and Newtown varieties seem to do best in the lower valleys, while such varieties as Rome Beauty, King, York Imperial and Jonathan prefer the higher altitudes. It must be thoroughly understood that certain parts of our state are more adapted to growing the different kinds of fruits, and do not try to grow those that are not adapted to



FIGURE 14—The result of a poorly formed head. Breaks when laden with fruit. Past redemption.



FIGURE 18—Result of removing limbs properly. No. 1 shows how a wound may be assisted to heal. No. 2 shows a wound perfectly healed. No. 3 shows wound almost closed.

your locality. There is always money in producing first-class fruit, no matter whether you are raising Newtowns or Baldwins.

In the eastern part of our state, where the altitude ranges from two thousand to four thousand feet, the fall varieties of apples may be successfully grown, but the fall varieties usually mature in high altitudes about the same time as the winter varieties in lower altitudes. The season is too short to grow winter varieties very successfully, while in the lower altitudes and valleys most any variety may be grown. Assuming the above list will enable one to choose judiciously his varieties, we will next take up the subject of

PLANTING

When to Plant—The fall is without question the time to plant in Oregon. There are a few objections to this in the eastern part of the state. The soil is more fit to be handled in the fall, the farmer has more time and the trees become well established before the growing season the following spring. Only once in eight or ten years will damage be done to an orchard in eastern Oregon if set in the fall.

How to Plant—The hole should be made to accommodate the root system without cramping it and deep enough so that the roots are not liable to dry out the following summer. The hole should be dug broad and plenty of pulverized soil placed at the bottom to furnish food for the tender feeding rootlets.

The thing to bear in mind is to plant your trees deep and allow the tap root to go straight down into the moist rich subsoil, and the other roots to make a lateral downward growth. The only guide as to depth is to place them a few inches deeper than they were in the nursery. The earth should be well packed about the tree when it is planted in order to withstand the pressure of the wind. While filling up the hole see that the fine soil is neatly packed among the fibrous roots and all roots are in their proper position. Trees should be planted only when the soil is in a friable, loose condition, as handling while too wet will do serious injury. If the trees are planted according to the foregoing manner and the top cut back, there will be no need of tying or staking. The question of setting the trees straight is solved by

every orchardist having his own plan, but the topography of the land figures quite extensively in the method. If the ground is level, have sticks about one foot long and secure a strong wire as long as the orchard if possible. Mark off the distance on this line for each tree and place a peg there. Then mark each side of the orchard in this way. To fill in the square draw the line from the end peg to the other, and then another row is put out. Thus the operation is carried to the other side. After the stakes are placed properly for the trees, secure a four-inch strip about four feet long with a hole in each end large enough to allow a stake to be driven through. Cut a notch in the middle of the stick; when you place the notch on the guide stake put a stake through each hole on the end, and then lift the bar to allow the digging of the hole. Having the hole dug, put back on the two stakes the marking bar and place the tree in the notch, instead of the guide stake. If this work is done carefully every tree will be in its proper place. (See Figure 9).

The plan of planting is to be decided by the individual. The two plans most used are the opposite or square (Figure 10) and the alternate or hexagonal (Figure 11). To set out the hexagonal the following plan which is taken from "Barry's Fruit Garden" is thought quite simple and efficient:

"Suppose, for instance, we propose to plant a plot of ground one hundred feet square, and to have the trees twenty-five feet apart every way, we make a triangle of wood, A, B, D (Figure 11), each side of which is twenty-five feet; we then measure the distance from the angle, B, to the center of the opposite side, at C, and this gives us the distance between the rows,

which will be about twenty-one feet. This will be called the small measure, and with this we measure off on two sides the distance for the rows, and put down a stake at each. We then commence on the first row, and with the long (twenty-five feet) measure mark off the places for the trees and put down a stake to each. The measurements must be made with exactness in order to have the plantation present a regular appearance, as in Figure 11."

The hexagonal plan will accommodate more trees and all will be an equal distance apart. In this plan there is a larger clear area about each tree. Be sure to set your trees properly and a good distance from the fence. Properly set trees are much easier to take care of than those that are improperly set. The distance for planting is much disputed among

horticulturists, but thirty-five to forty feet is the most desirable for apples. Never, under any conditions, plant less than thirty feet apart.

CARE OF TREES

At Planting Time—Prune the roots as soon as they are dug and immediately pack them for shipment, or, best of all, put them in their permanent place if possible, always protecting them from winds, freezing temperature and strong sun. Cut all damaged and bruised roots off at planting time and remember always to keep them covered



FIGURE 17—Usually the result of the open center tree. This may be prevented by artificial wiring or inarching, but expensive and unsatisfactory. This may be partly obviated by judicious training and pruning.

with a wet cloth, straw or moss while out of the ground.

PRUNING

This is a broad subject and one that is not much understood by most people. Usually, when a man buys trees, he thinks he must be always pruning them, but such is not the case. Pruning is to assist nature and must be done with certain definite objects in view, namely to promote growth, to produce fruit spurs, to retard excessive growth, and to form the tree in the desired shape.

There is a struggle for light, heat and air among the individual branches or twigs of a tree which is commonly termed "struggle for existence." Every twig requires air, heat and light, and as each has not the same position on the tree, some must die or be removed. Those near the center must be watched more closely, as those near the outside receive plenty of air and sun. Almost every variety of trees have their individual shape. If each is studied and pruned according to their characteristic tendencies, the process of pruning will be very simple.

At Planting Time—When the young trees have been root-pruned and planted, cut the top back so it will balance the



FIGURE 21—A group of satisfactory pruning tools. Every one necessary. Do not overlook the paint or wax can.

root system, and, by all means, do not allow all the scaffold limbs to issue from or near the same place. A tree with limbs issuing from the same point is doomed when the fruiting period begins, and the danger increases as the tree grows older. (See Figures 13 and 14).

Some people prefer the high-headed trees, while others favor the low-head, and this is determined to a great extent by the conditions of the locality, but the ease of picking, spraying and pruning low-headed trees far outclass the disadvantages of cultivation, and for the above reasons the low-headed tree is always to

port the fruit. As stated before, the low-headed tree is much easier pruned, sprayed, picked and the trunk protected from sun-scald. Cultivation can be done easier with low-headed than with high-headed trees. Ordinarily the trees are not kept pruned and the limbs droop, so as to hinder cultivation.

The choosing of low or high-headed trees usually determines the profit or loss to the grower. Therefore, summing up the advantages of the low-headed tree and comparing them with the advantages of a high-headed one, it is readily seen why the former is considered the best.

The yearling tree which is very little larger than a good sized buggy whip, should be cut off about forty inches from the ground when planted and those buds eighteen to twenty inches from the soil should, be encouraged to form the crown. All below should be removed.

Annual Pruning—After the crown has been properly started the first year, the next great important step is to decide at the beginning of the second year whether you are going to grow trees with a central leader or hollow center. These methods of forming trees are much discussed by prominent orchardists throughout the state, and both methods are being used. The great advantage of both methods being used in this state is that they afford an object lesson, and hence we have but to compare results. (See Figure 17). The object of cutting out the center of a tree is to give more light, more circulation of air and better color to the fruit. By this method the life of the orchard is sacrificed for the above conditions, as the trees trained in this way break down when they begin to bear, or necessitate continual wiring of the scaffold limbs.

All of this is, of course, unnatural and expensive and can be overcome by proper pruning and permitting the central leader to remain.

When the leader is permitted to make a strong, upright growth, it acts as a balance to the whole tree and does away with inarching, wiring, and with judicious pruning the trees do not need propping. Generally the open center tree is denser in the center than the other, for the scaffold limbs are pulled too close together.

Interlacing, crossing, rubbing and diseased branches must always be removed, no matter what the ideal form of the tree may be. If your trees are making too much wood growth, cut them back in the summer, which will cause them to produce fruit spurs and make a stronger growth, but do not cut back too far, as the fruit is liable to sun-scald, and if pruned too severely the tree will make a heavy sucker growth. It is best to prune moderately in winter for excessive and undesirable growth, and prune moderately the following summer, about July, to check the wood growth. If the trees are making a poor wood growth and more wood is desired in preference to fruit, prune in the winter. This must be done in moderation to avoid a heavy sucker growth the following summer. It

is always best to prune moderately every year, both in winter and summer if necessary. Pruning may be done in Oregon any time while the trees are dormant, except when severe freezes are frequent.

In pruning the tree fruits, always make a clean, smooth cut and have a bucket of good wax or paint handy and thoroughly cover the wound. This prevents decay of the wood and allows the new tissue to grow over unmolested by fungi or the elements. The cambium or inner bark will begin to cover the wound as soon as the tree becomes active in the spring, but will form only over a limited portion of the cut surface. The growth of the cambium can be encouraged and made to completely cover the wound if cut along the inner side of the callous with a sharp knife. In all your pruning take the branch off just as close as possible to the limb where it issues and never leave a stub. (See Figures 18, 19, 20, 21, 22 and 23).

SPRAYING

This subject is becoming of great importance, as our orchards show, if we stop to examine them. Spraying is only one of the requisites to success in up-to-date fruit growing. It must be understood that spraying cannot take the place of cultivation and is only an insurance to the grower. Trees grow by assimilating plant food, and if scale and other diseases are at work the trees do not develop and the fruit is not allowed to go on the market. There are five essential operations upon which success in fruit raising depends. They may be given as follows: Tillage, fertilizing, pruning, spraying and thinning.

Spraying is becoming so thoroughly understood that most of the diseases can be held in check or entirely eradicated. Spraying should be done every year to guard against any disease that the tree may become affected with, or to destroy what may be already established, and destroy those pests that are injurious to the fruit. Years ago horticulturists did not understand much about fruit diseases and the effects of spraying, but the problems are being very rapidly solved. (See Figure 24). The kind of machine and apparatus to use depends upon the notion of the fruit grower. However, the pump should be strong and well fitted with hard brass working parts. The nozzle must be chosen in regard to its power to



FIGURE 19—This kind of pruning is never permissible; always cut close to the trunk and make a smooth wound.

be recommended in this state. (See Figure 15). It is generally thought by fruit growers that the high-headed tree is better, as it allows better and easier cultivation. This is the main point upon which the advocates of high-headed trees base their whole argument. A high-headed tree is generally the worst kind to cultivate under, for usually the lowest limbs are permitted to make a decided lateral growth almost parallel with the soil, and when these limbs are laden with fruit they extend almost to the ground and it is readily seen that close cultivation is impossible.

The trees in the old orchards and yards all over Oregon show the evolution of the high-headed tree. It is simply this, when the lowest limbs interfere with cultivation they are removed, the next set of limbs are permitted to make a lateral growth similar to the first, and eventually these are cut off. Thus it continues until the crown of the trees is ten to fifteen feet from the ground and the fruit is practically out of reach. (See Figure 16).

On the other hand the crown of the low-headed tree is started near the ground and the limbs make an upright slanting growth, which allows far closer cultivation. The limbs, by pruning, are caused to grow strong and able to sup-

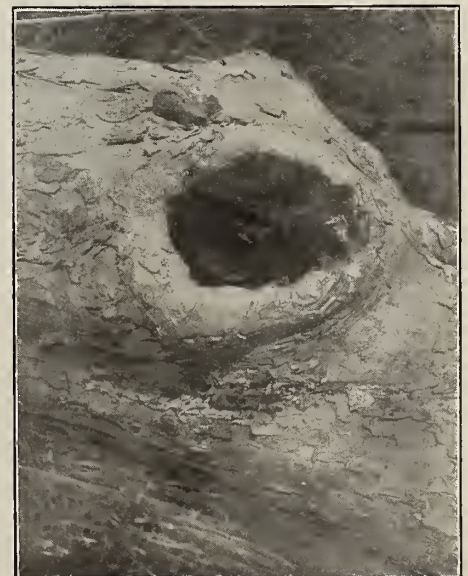


FIGURE 20—The result of leaving a stub. The heart of the tree is all decayed.

carry and deliver the material properly. There are now many different kinds of spray outfits, but the ones that are desirable are those that meet the above requirements and can be well operated under the existing conditions where they are to be used. (Figure 26). When you spray, do it at the proper time and do it well. If you do not, it is a waste of time and material. The material must be properly mixed according to formulas given in the best spraying bulletins. For further knowledge of the pests and diseases and how to combat them, the reader is referred to bulletins on spraying issued by Professor A. B. Cordley of this station.

THINNING

Thinning the fruit is a practice always advised and is exceedingly profitable. Some people think it does not pay, but there is hardly today a successful fruit grower in the state who does not thin his fruit, and this thinning is the key to his success over those who have favorable conditions, but do not put out the first class product. The fancy fruit and price is obtained by proper thinning. It makes the fruit larger, better color, preserves the vitality of the tree, destroys disease infested and imperfect specimens and tends to cause the tree to produce an annual crop. All the fruit must be picked sooner or later, and many more apples will be worth picking if encouraged by thinning. An orchardist in Southern Oregon thinned his apples this year to one on a spur and the result was that ninety per cent of the entire crop sold in the three and one-half tier class. Determine then for yourself if it pays.

Always thin to one fruit on a spur, and where the spurs are close all the fruit should be removed on a few of the spurs. The best apple of the cluster is the one to leave. The earlier the thinning the better, as the remaining fruit receives all the energy from the very first of its growth. The thinning should be done when the fruit is about the size of a hazel nut. It sometimes requires more judgment and discrimination to thin fruit properly than it does to gather it. The cost of thinning depends upon the price of labor, and the condition of the trees. Usually the price will range from fifteen to eighty cents per tree.

Do not let your trees bear heavily while young, as every fruit they produce reduces their vitality and heavy yields ruins the form of the tree. There is plenty of time for trees to bear after they have received the proper training and preparation for future usefulness. Some men boast of the wonderful yield of their two and three year old apple trees, but

they do not realize what that means to them in the future.

POLLINATION.

There is no greater need of study of any one phase of pomology more than pollination. The present knowledge among horticulturists of this subject is quite limited, but we are rapidly securing more valuable facts along this line.

It is not safe to plant an orchard without knowing whether the varieties are self-fertile or self-sterile, and their ability to cross-fertilize with other varieties. Not all failure to set fruit is due to

varieties blossom and the pollen must be potent on that variety. Up to the present time all the work in pollination has shown the following varieties are more or less self-sterile and should not be planted alone: Northern Spy, Gravenstein, Grimes, Tompkin's King, Red Astrachan, Esopus Spitzenberg, York Imperial, Bellflower, Winesap and Willow Twig. The varieties that are found to be self-fertile are: Rome Beauty, Jonathan, Ben Davis, Oldenburg, R. I. Greening, Fallawater, Baldwin and Yellow Transparent. The pear varieties considered self-sterile are: Anjou, Bart-

lett, Bosc, Clairgeau, Clapp, Columbia, Gray Doyenne, Easter, Howell, Idaho, Jones' Seedling, Kieffer, Lawrence, Louise, Mount Vernon, Pound, Sheldon, Superfine and Winter Nelis. Those considered self-fertile are: Buffum, Angouleme, Elizabeth, Flemish, Le Conte, Seckel, Tyson and White Doyenne.

"Some of the combinations that have been successful in many parts of the country for planting together are: Bartlett with Nelis, Flemish Beauty, Easter, White Doyenne; Idaho with Bartlett; Kieffer with Le Conte, Garber; Coe Golden Drop with French Prune, Green Gage, Italian Prune; Satsuma with Abundance, Burbank, Red June; Miner with De Soto, Forest Rose, Wildgoose; Wildgoose with De Soto, Newman, Miner." — How to Make a Fruit Garden.

There are two main factors in selecting varieties for cross-pollination. The first requisite is that there must exist a mutual affinity between the two; the second, they must blossom about the same time.

The 1905 report of the State Board of Horticulture contains a very valuable chart on the blossoming of varieties. The chart, which is compiled by Professor E. R. Lake of this station, may also be found in his Bulletin No. 82.

RENOVATING OLD ORCHARDS

In almost any part of our state can be found orchards of advanced age which do not pay, and it is readily seen that some-

thing is wrong. The problem of renovating an orchard is sometimes a large one, and often proves to be very expensive. The causes which are responsible for an unprofitable orchard are many and may be briefly stated thus: Unsuitable varieties, poor drainage, unfavorable site, poor soil, neglect, unfavorable climatic conditions and old age.

The first and most important point in rejuvenating an orchard is whether or not the trees are worth saving. The varieties may be not what you desire or too far gone to be responsive to treatment. If the trees are on wet land, cut them down or thoroughly drain the soil,



FIGURE 22—This tree has been neglected and unprofitable for years.

imperfect fertilization. The efficiency of pollen varies with the conditions of the tree and environment. Some of the main factors which govern pollination are vigor, variety, health, age, heredity and vitality of the tree. Most all varieties are improved by cross-fertilization, and a large orchard should be planted with one-third of the trees as pollen producers.

It is known that the same varieties do not blossom at the same time in different parts of the state, but like conditions will affect the same varieties alike. Varieties that are useful for producing pollen must blossom at the same time the desired

as a fruit tree will never thrive with wet feet. Apple trees over thirty-six or seven years old, which have long been neglected, are not worth saving; likewise the cherries over twenty, the pear over twenty-two or three, the plum over fifteen and the peach over twelve years of age. In fact, the trees which should not be worked with are those with a high head, partially decayed trunk and in a generally run-down condition. If nothing more serious than insects and fungus diseases are present, the orchard may be very economically reclaimed, as, for example, the Eisman Brothers' orchard, which was saved from anthracnose by Professor A. B. Cordley of this station.

The renovating of old trees requires practically the same treatment and methods as to properly care for the young orchard. The trees must have a general awakening and started into growth both in fruit and wood. They should make new twigs twelve or more inches long each year, instead of the usual one-inch growth. The first thing to be done is to break up the sod and get the soil into cultivation and feed the trees by applying barnyard manure, wood ashes and any nitrate or phosphorous fertilizer. Especially add nitrogenous cover crops. This is essential for stimulating a good growth of the trees.

See that all surplus water is carried away and then begin war on the large army of insects and numerous diseases that have been at work for years. Buy a good spray outfit, with plenty of material to spray with, and learn thoroughly how and when to use them. Spraying calendars, as well as information on diseases and insects, may be had by applying to the station director for bulletins on the subject. Every other tree will probably have to be removed, as the older orchards were generally planted too close. Make a thorough study of your orchard before cutting out any trees, and arrange if possible to cut out those that cannot be saved by the most skillful treatment.

Next comes the management of the individual tree. The chances are that the tree presents a hard appearance. In this climate the moss and lichens soon cover the bark and water sprouts become numerous. Various fungi and insects thrive unusually well here, and at the expiration of twenty years or more the uncared-for orchard is quite a study. The first thing to do with the tree is to prune it properly if it is not to be top-worked. Do not prune the tree too severely the first year, as it will produce suckers and water sprouts in large numbers, but keep after it systematically each year until the tree is well thinned and properly

balanced. (See Figure 23). If you do not wish to keep the original varieties, the trees may be top-worked or grafted. It is not advisable to graft trees that are too old, as usually their vitality is low, and better fruit can be obtained sooner from newly planted trees. (See Figures 26 and 27).

Do not graft limbs that are over three or four inches in diameter, as young wood unites better and makes superior growth. It is best to graft the smaller limbs of the tree in such a manner as to form a well balanced head and leave plenty of the original top to carry off

quarts of warm water; when dissolved add them to the required amount of water.

This formula is valuable for spraying very delicate foliage and is among the best, if not the best, of the remedies for the codling moth.

Contact Insecticides.

Lime, Sulphur and Salt—Oregon

Formula.

Quicklime	50 pounds
Sulphur	50 pounds
Water	150 gallons

Slake the lime thoroughly, add the sulphur, cover with water, and boil briskly for at least an hour, until the mixture is of a deep blood red color with but little free sulphur on the surface. Add water to make 150 gallons.

This wash is the most satisfactory for San Jose scale and also a good fungicide.

Fungicides.

Bordeaux Mixture for Dormant Plants—Bordeaux for Winter Use.

Copper sulphate	6 pounds
Quicklime	6 pounds
Water	50 gallons

This formula should be used only upon dormant trees.

Bordeaux Mixture When the Tree are in Leaf.

Copper sulphate	4 pounds
Quicklime	6 pounds
Water	50 gallons



FIGURE 23—Same tree as shown in Figure 22 after pruning. More than enough wood left. If pruned too severely the first year, a growth of water sprouts would be the result. It may be headed back and lightly pruned next year.

the surplus energy until the grafts require the room, which is about the second year. Cleft-grafting is the best method for working over large trees. A top-grafted tree will usually come into bearing in three to six years.

FORMULAS FOR SPRAY MIXTURES.

Food Poisons—Arsenate of Lead.

Arsenate of soda	4 ounces
Acetate of lead	11 ounces
Water	15 to 20 gallons

Dissolve the arsenate of soda in two quarts and the acetate of lead in four

quarts. He thinks such an exhibition will open a market in China for Oregon apples, which he regards as the finest in the world.

The request is looked upon by apple shippers and growers as a high tribute to Oregon apples, and is regarded as an important opening for Pacific Coast fruit in the Orient. That the fame of Oregon apples has penetrated to the representative of the greatest and most exclusive government among the nations of the far east is thought to be evidence that Oregon apples will soon be known in all the civilized parts of the world.

DISCUSSION OF DRY SOIL CULTURE FOR ORCHARD

BY F. E. MERRICK, MEDFORD, OREGON

IT SEEMS strange that since the cultivation of the soil has been man's chief occupation since the dawn of civilization that this society finds it necessary to occupy its time with a discussion of this subject.

One would suppose that this simple subject would have been so thoroughly understood by our ancestors for ages past that there would be nothing left for us to do but follow their acquired knowledge and teachings.

Especially is this thought emphasized when we take into consideration the fact that more people and capital are represented in the cultivation of the soil than all others combined on earth. With these stupendous facts staring us in the face, let us analyze the situation as we find it. We have a free school system in America which should from necessity fit our boys and girls with at least some knowledge of so important a branch of our nation's commerce, yet I will venture to say that not one high school graduate in a thousand can explain the elementary principles of soil culture, including percolation, evaporation and capillary movements of rain water.

This lack of information we find also among many of those who till the soil, a thorough understanding of which would enrich our state and nation by millions of dollars each year, thereby increasing the comforts and happiness of rural homes.

Those who are acquainted with the subject of soil culture realize that it is impossible to formulate any rule by which to guide the orchardist under all conditions.

The seasons vary so much that we find our plans which we have contemplated, often frustrated at the start and each day calls for the application of scientific principles which should be thoroughly understood in order to make the best of these situations as they arise. The Rogue River Valley and many of the other fruit districts of Oregon have the larger percentage of their rainfall during the winter. These ample winter rains are sufficient to furnish moisture for large

crops of fruit when the conservation of moisture is made available by the proper physical condition of the soil to receive, store, and later by cultivation to furnish through capillary attraction the moisture as needed. It is therefore necessary to have a fine, compact subsoil of good depth and proper drainage in which to store and retain the winter rains. Care should be taken that as little of this water as possible should escape through

finer mulch to turn into the bottom of your furrow and may also serve to keep the soil from baking till the plowing can be done in case dry sunny weather follows heavy spring rains. Following the plow with the harrow to break up the soil should be done every half day, because evaporation is very rapid at these times. When plowing is left lumpy and loose the evaporation is quite as great as though no plowing were done.



FIGURE 24—The smooth twigs have been sprayed each year, while the moss-covered ones have been neglected. Lime and sulphur sure death to moss.

evaporation or running off from the surface. This can be done by never allowing the surface to become hard or compact. By so doing moisture is kept in the ground beneath the loose soil mulch and a more rapid percolation is allowed of any heavy rain that may fall, a fact which can be nicely illustrated by a sponge, which takes water more readily when slightly moist than when dry.

The matter of economy of water is more fully appreciated in less than a normal rainfall, when just a little more moisture at the needed time in a dry season would carry along a crop of fruit to maturity which might otherwise suffer greatly. The greater the depth of moisture stored in the soil the better you are prepared to take care of any demand, and if not heeded it can be carried over for another season.

Having stored the water, the matter of capillary attraction and cultivation during the summer is of vital importance. In our climate it is found advisable to plow our orchards as early in the winter or spring as the soil becomes in a fit condition; that is, when neither too wet or dry, but just when the particles of earth separate from each other as thrown over by the mouldboard. It is often a great advantage to disc the land before plowing. This helps to make a

for the soil in this condition is scarcely any protection to the capillary tubes.

Two or three inches of loose soil mulch has been accepted by many as sufficient, but in this locality where the altitude causes a dry atmosphere a mulch of six inches is better. Otherwise the sun's rays cause a hardened and baked condition in the soil immediately underneath the mulch excluding air from roots and feeders.

By what is known as capillary attraction the moisture rises through the compact subsoil to the surface, the same as the oil in a lamp follows up through the wick to be burned. When this moisture which feeds the roots in its upward movement comes in contact with the loose dry mulch above its connection is broken, thereby reducing the evaporation that would ensue if it reached the surface.

As soon as the soil is dry enough to work after a rain this mulch should be stirred by harrow to break up the compact condition caused by running together of the soil particles or capillary tubes. Subsurface packing, which consists of packing the lower portion of the plowed furrow, although highly recommended in the cultivation of some crops, I do not see the necessity of in the orchard. The tree roots are below the cultivated soil, while in subsurface packing the object is to make a firm seed bed for root crops or cereals, with the usual loose mulch for a covering. The effect

Continued on page 21



FIGURE 27—Young top-worked tree. The scions have grown rapidly and a well balanced tree is the result. This tree will need judicious pruning and care for several years. Photo taken year and a half after grafting.

AMONG FRUIT GROWERS OF THE PACIFIC COAST

SPokane, Washington, boasts of an even larger output of apples this year than last. Mr. Newton of the firm of Ryan & Newton, commission men of that city, recently said in regard to it: "I would say that the crop is at least 25 per cent greater than it was last year, and the prices we are paying for apples are now double what we were compelled to pay at this time last year. The prices to be obtained in the eastern markets, however, are proportionately higher,

firm recently sent a box to President Roosevelt and another to Secretary of the Navy Bonaparte. Not to allow the higher officials to entirely monopolize the attention of fruit epicures, Senator Jonathan Bourne also placed an order with the Davidson Fruit Company of Hood River for fifty boxes with which to entertain his friends this winter.

Mosier Valley, according to a big delegation of Portland business men who went there as the guests of the local

mercial uses will be grown in this big orchard, which will be cultivated and managed along up-to-date lines from the start.

Rogue River Valley, Oregon, as a pear country apparently has the world beaten. Recently Medford pears of all varieties have broken records for prices. The records for high sales there this year are: \$8.40 a box for Comices, \$5.05 a box for Bartletts, \$5.60 for D'Anjous, \$4.10 for Beurre-Bosc and \$3.50 for Howells and Winter Nelis. From sixteen acres of

the latter variety Fred H. Hopkins netted \$19,000, and even this record is equaled and surpassed by other orchards. G. H. Hover purchased ten acres fifteen months ago, paying the record price of \$560 an acre. Since then he has sold two crops of Comice and Buerre-Bosc pears for a total of \$9600, or a profit of \$4000 above the purchase price.

Puyallup, Washington, was the center of an interesting meeting of fruit growers November 2, presided over by E. B. Ridge. The meeting was called to order by W. H. Paulhamus and was addressed by Professor E. E. Elliott of Pullman College, Professor Lawrence, A. I. Mason of Hood River, Dr. F. J. Soule of Spanaway, and Fruit Inspector E. S. Ridge. The meeting extended over a period of two days and was a very successful one.

Yamhill County, Oregon, held its first apple show at McMinnville recently. It was a great success and the crowds in attendance taxed the building to its utmost capacity. Altogether there were 192 boxes and plates exhibited by forty-five apple growers, including twenty-three varieties. This did not include the unsurpassed exhibit of M. O. Lownsdale of Lafayette, which was not in competition. Lownsdale's exhibit alone included twenty-five boxes, twenty-one plates and three large crates.

Lane County, Oregon, will work for better fruit according to the Eugene Register, which says: "If the Lane County Fruit and Vegetable Growers' Association carries out its plans to see that nothing but the best quality of fruit is shipped out of Lane County in the future and it is cared for in the most modern way, Lane will add to her present reputation for the best cherries to be found anywhere, and a record for pears and apples as good as Southern Oregon or Hood River now enjoys."

Mosier, Oregon, this year organized an association and in future expects to pack and ship its own fruit, which has heretofore been largely handled from Hood River, as the product is grown in the same district and is similar to the Hood River fruit. Eighteen cars of prunes were shipped from Mosier this fall in addition to several cars of pears



FIGURE 26—A fair-sized tree cut back for top working. Be sure to leave some of the top to carry off the surplus sap.

though, of course, not double that of last year. I should say that the value of this year's apple yield will be fully 150 per cent greater than that of last."

Pullman, Washington, also had its apple crop held up by the car shortage, causing a suspension of packing. With its warehouses full of fruit, shippers were forced to stop receiving, and its growers forced to place thousands of boxes in grain warehouses until they could be shipped out.

White Salmon, Washington, for several years one of the first towns in the Northwest to put strawberries on the market, is demonstrating that it will soon also be an apple growing district of no mean proportions. Capitalists from St. Paul and other places in the Middle West have bought large tracts there which they will clear and set to trees, and much land is also being put in condition for that fruit by local owners. Several thousand boxes of choice apples were shipped from White Salmon this year.

Ashland, Oregon, having successfully grown about every fruit that can be raised in the temperate zone, recently discovered that the olive also does well there. The trees are in the yard of H. L. Whited, and one of them has attained a height of twelve feet. They were set out with the idea that they were a dry land tree, but it has been found that they thrive better with plenty of moisture. The trees bloomed twice this year, a second blossoming coming on in June after a late frost had nipped the first crop of blooms.

Hood River, Oregon, apples will hold the fort at Washington, D. C., this winter if the number of them being sent there is any indication. A Portland

Commercial Club, soon bids fair to rival Hood River. While undeveloped, Mosier is rapidly coming to the front as a fruit raising center, and this year shipped out about 10,000 boxes of the finest of fruit, which sold at top notch prices.

Linn County, Oregon, claims that it will soon have the third largest orchard in the state. Two hundred acres will be planted this winter and 100 next winter. A Portland company, of which Chester A. Parvin is superintendent, has bought 300 acres for this purpose beside Twin Buttes, three miles southwest of Brownsville. Only standard apples for com-



FIGURE 25—The only way to keep pace with the multitude of insects and fungi. There are now many different spraying machines on the market.

and peaches, and its apple output is expected to reach 4,000 or 5,000 boxes. The largest grower at Mosier at present is the East Hood River Fruit Company, which is developing a 300-acre fruit farm there and already has a good many acres in bearing. This company is under the management of A. P. Bateham, and has one of the largest strawberry fields in Oregon, having 40 acres planted to berries.

Seattle, Washington, occupied the center of the stage in the strawberry line in November when James Hart, a pioneer citizen there, took several newspaper men into his garden and showed them a fine lot of berries as big as a half dollar.

Wentachee, Washington, was one of the fortunate places that made a big shipment of apples before the car shortage got in its work. Over 200 cars were sent out before November 20, and reports from there are to the effect that practically the entire crop was successfully marketed.

Coos County apples, as displayed by the Commercial Club of Marshfield in Portland last month, show that there is something doing down there besides the lumber industry. The exhibit was a fine

one and included the following varieties: Baldwin, Gravenstein, Salome, Langford, Northern Spy, Spitzenberg, Ben Davis, King and the Coos River Beauty.

The Stevens County Association at Meyers Falls, Washington, placed its fruit with two large Eastern houses this year through a buyer at Spokane at a big advance over last year, and will put up a finer pack than it has in any former year. This is another country that has been somewhat overlooked by apple buyers in previous years, but which it is safe to say will receive their attention in future seasons when its product becomes better known among the big concerns in the East.

Orondo, Washington, claims the distinction of selling 853 boxes of Ben Davis apples for \$1,066. Winesaps, White Winter Pearmain and Jonathans also sold for \$2.25. As a fruit country that near Orondo is said to be developing rapidly and is soon expected to make an excellent showing in comparison with other districts.

Madras, Oregon, wants it understood that Crook County recently exhibited some apples at the county fair there that were not to be sneezed at. The fruit was from the Cove Orchard and included no

less than 45 varieties, among them several boxes of Winter Bananas. In addition there was also a good display of peaches, pears, plums, apricots and English walnuts.

Peaches, pears and prunes have been shipped in large quantities from The Dalles this season and have uniformly brought a high figure. At the packing house of R. H. Weber a big crew was engaged for several weeks in shipping out these fruits and many carloads have been sent to the East almost at the grower's own price. Cherries formed a big part of The Dalles product this year and it is expected next season to put in a system of refrigeration for this fine fruit that will allow of its being shipped to the great markets of the East.

Reports from the Yakima Valley, Washington, are to the effect that 700 cars of fruit have been shipped from there already this season and that 400 or 500 cars of apples will be shipped out during the remainder of the year. That good prices were received goes without saying as the Yakima fruit has been successfully handled for several years and is this year in the hands of a better association than ever with a competent manager.



This tree yielded sixteen boxes of pears, which were sold for \$1.25 to \$1.50 per box. Not less than 134 such trees can be grown to the acre. Pears are one of the most profitable crops at Hazelwood

HAZELWOOD FRUIT DISTRICT NEAR SPOKANE

FRUIT raising in the Spokane country and the Inland Empire of the Northwest is rapidly reaching proportions that not long ago would have been incredible. Fourteen million dollars this year, against \$9,000,000 last year, and almost nothing a few years ago, and this is only a small beginning. Spokane has made such gigantic strides in almost every other direction that fruit raising, which has made gigantic strides also, has not made the commotion that it has in the districts devoted exclusively to fruit.

The next few years will see a bigger development in fruit raising in this section than the past, as hundreds of acres of the finest fruit land in the Northwest are being set to choice varieties of apples, pears, cherries and other fruits.

It has been demonstrated that as much and as fine fruit can be grown on an acre of Spokane soil, especially with irrigation, as anywhere else in the world. When the right amount of water is put on the soil and joined with sunshine, perfect fruit is the result.

R. A. Jones, who has an orchard six miles northeast of Spokane, has cleared over \$1,000 per acre from one crop of peaches. A single eight-year old Bartlett pear tree in the Hazelwood district yielded sixteen boxes of fruit this year that were sold for \$1.50 per box. One of the new fruit districts near Spokane which is being transformed into productive orchards and beautiful homes is the Hazelwood irrigated farms, six miles west of Spokane on the Spokane and Medical Lake electric road, and comprising what was formerly the famous Hazelwood dairy farm of 3000 acres. This was cut up into small tracts and put under irrigation last spring with one of the most perfect irrigation systems in the country, costing close to \$200,000. Already over half of this land has been disposed of in small farms, and beautiful and profitable homes are beginning to spring up. Many of the tracts have been set to fruit trees and many more will be set to trees in the spring. Fruit men who have seen this section predict that it will be one of the choicest fruit districts in the Northwest, particularly for cherries, pears and certain varieties of winter apples.

The Vineland Nurseries Company of Clarkston has selected a forty-acre tract which is being put in shape for a large and first class nursery.

E. L. Stewart, the "apple king" of Prosser, who is well known to all fruit growers of the Northwest as president of the Washington State Horticultural Association, as well as the man who cleared \$725 per acre profit last year from his six-acre apple orchard near Prosser, and who has

done more, perhaps, than any other man to boost fruit raising in Yakima Valley, has purchased ten acres at Hazelwood, which he will set to apples and cherries.

Arrangements have also been made with Mr. Stewart by the company to have him take charge of the growing of fruit trees on a large tract to be set out by it, as well as on such tracts as are sold under the improvement contract to buyers who

do not wish to live on the land right away, but wish to have trees planted. It will be of untold value to this district to have a man with the experience and remarkable success of Mr. Stewart for its horticulturist. It also speaks well for the district when such a man will leave one of the most profitable orchards in the state to buy new land and set out another orchard.

DRY SOIL CULTURE USED FOR THE ORCHARD

Continued from page 18

of a surface roller on most of our heavy orchard soil would be to pack the surface and thereby render connection to the capillary tubes, allowing moisture to escape by evaporation. Its use should be confined to crushing lumps, afterward to be followed by the harrow.

For cultivation under low headed trees I have used the riding cultivator for a frame, to which is attached a pole, which extended to each side, to which a section of a spring-tooth harrow was fastened to steady it. A chain was hitched in clevis of spring-tooth and carried forward around cultivator frame to draft in front. In this way no limbs interfered with the cultivation.

It is well to bear in mind the necessity of watching closely the condition of the surface just under the mulch and break up any crust that forms, so as to allow

equal distribution of air to the roots, which is more necessary than is generally understood.

If the foregoing methods are employed weeds are not apt to damage much. They have been a benefit many times by causing cultivation to eradicate them, which otherwise would not have been done, thereby enriching their destroyer unknowingly by causing thorough cultivation. The evaporation alone from a square foot of ground where the conditions are most favorable for capillary attraction will amount to a quart of water in a day. By a thorough study of all these conditions the horticulturist can decide for himself what kind of cultivation is best adapted to his particular soil and locality, thereby adding to his success as much as by any other branch of his profession.



READY TO PICK BARTLETT PEARS AT HAZELWOOD

SOME BENEFITS AND PURPOSES OF COVER CROPS

COVER crops, as the name suggests, are for purposes of protection or conservation of the fertility of the soil. Those cover crops which make their growth in winter conserve the soil's fertility by absorbing the nitrates that have become soluble, and that in the absence of green plant roots would be carried off in the drainage water and utterly wasted. One of the chief functions of winter-growing cover crops is to prevent this loss of

money and without price. A hundred pounds of nitrogen should easily be worth \$12, and we have often obtained an increase in crop worth far more than this from utilizing the entire growth or even from utilizing only the stubble from vetches, crimson clover, cowpeas and velvet beans.

We may somewhat appreciate the importance of this work done by the leguminous plants when I state that in experiments at Auburn we have repeatedly found more than 100 pounds of

money and without price. A hundred pounds of nitrogen should easily be worth \$12, and we have often obtained an increase in crop worth far more than this from utilizing the entire growth or even from utilizing only the stubble from vetches, crimson clover, cowpeas and velvet beans.

Cover crops may be divided into two general classes according to their habit or season of growth. Those growing during the summer are useful chiefly for the nitrogen which they accumulate.



BARTLETT PEAR TREE IN AN ORCHARD NEAR THE DALLES, OREGON

nitrogen, a loss which on rich land may amount to many dollars an acre; for nitrogen in this form is worth 12 to 15 cents per pound and experiments with very rich garden soil have demonstrated that as much as 100 pounds of nitrogen may be lost from an acre per annum. It is doubtful whether the loss on most soils is more than ten or twenty pounds per acre per annum, and on the poorest soils it may sink to a very small amount. From this it follows that the richer the soil the greater the need for winter protection through the presence in winter of growing plants. This function of preventing leaching may be just as well performed by rye or wheat or oats as by the vetches and clovers. But there is a still more important function which can be performed only by the leguminous plants. I

nitrogen contained in the vetch or in the crimson clover growing on an acre. These results were obtained on soils so poor as to yield very little nitrogen to a crop of rye, grown as a check, thus indicating that about 100 pounds of the nitrogen of the winter growing legumes had been obtained from the air without

Those growing during the winter perform this function equally well and in addition greatly reduce leaching and to a considerable extent prevent washing.

While a winter cover crop is an almost universal need of the orchard, it is much more important in the South than in the Northwest.



LIBM OF CHERRIES GROWN AT HAZELWOOD

FRUIT DEVELOPMENT AT THE DALLES, OREGON

WHILE the second oldest town in Oregon, The Dalles, was one of the last to take up fruit growing from a commercial standpoint. For many years it has been the metropolis for the grain growing, sheep raising and cattle district in the interior of Eastern Oregon. At the head of navigation on the Lower Columbia River, it has been the center for a big volume of river business for many years, in addition to being on the main line of the O. R. & N. Railroad,

markets of the Pacific Coast or elsewhere. Peaches are also a most successful crop in this district. The soil there, which is of a volcanic ash nature on the uplands and alluvial on the bottom lands, produces to a remarkable degree almost anything that is planted. On the former are grown peaches, cherries, apples and grapes. The finest of melons and canteloupes are also raised near The Dalles and have a reputation for excellence and high prices in many markets.

Oregon, were to be seen, side by side with peaches, pears, apples, prunes and other fruits, all of which gave very abundant evidence of the adaptability of soil and climate to most successful and profitable fruit raising.

During the past few years a large acreage has been planted to fruits, and the uniform success met with is stimulating a still greater development.

Last year there were shipped from this district to ten different states, 41,851



HUNGARIAN PRUNE TREE WITH ITS LOAD OF FRUIT NEAR THE DALLES, OREGON

and the county seat of Wasco County, one of the richest counties in natural resources in the state.

The country around The Dalles that is best adapted to fruit growing is rolling. On it are grown fine cherries, grapes, peaches, apples and melons. In fact, its cherries for several years have been recognized as having no superior in the

Recently apple culture has been taken up, and at a fair held there this fall many boxes of this fruit, excellent in size, quality, and well packed, were on display. To many this exhibition was a revelation, on account of the great variety of fruits displayed and their uniform fine quality. Grapes, the equal of those grown in California, or Southern

boxes of prunes and plums and 34 car loads of fruit, including some of the choicest varieties of apples. The Dalles Fruitgrowers' Union supplied the people of the East with 83,000 boxes of choice fruit grown in that locality, and 25,000 boxes of fine peaches were shipped by individuals. These shipments brought growers there about \$125,000. The lands that produce this fruit lie contiguous to the city, and comprise valleys near Chenoweth, Mill, Three Mile, Five Mile and Eight Mile Creeks. Not over five per cent of the area suitable for fruit there is cultivated. In the near future when these lands are planted in orchards this section will be one of the heaviest fruit producing portions of the Northwest.

In addition to the above large shipments of fresh fruits, 100,000 cans of cherries were put up in the large cannery there and shipped to the big cities of the East.

As to The Dalles itself, it is in every respect a bright, up-to-date little city of five thousand wide-awake, hospitable citizens, possessing all modern improvements that make a good business and home town.

Oregon Life

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A. L. MILLS, President L. SAMUEL, General Manager CLARENCE S. SAMUEL, Assistant Manager

A FEW OBSERVATIONS ON THE FINANCIAL FLURRY

BY E. H. SHEPARD

BEING intimately acquainted in banking circles in the large cities, and at the same time a resident in a little city in a prosperous fruit section, naturally we have kept in pretty close touch with the financial situation during the past few weeks.

In the late uneasiness, as a result of our observation, certain conclusions have forced themselves on us which we believe are of sufficient interest to the fruit grower to justify us in giving our views editorially, although editorials on finance are really outside the aim and the field of a horticultural journal like "Better Fruit," devoted to the technical work of bettering the condition of the fruit industry. In the first place we think it is generally conceded that savings banks are the first to suffer from any excitement which creates a lack of confidence, and the reason seems clear. The savings bank depositor usually has his "all" in the bank. This fact alone is a reason why savings banks are the first to feel the financial disturbance. As savings banks seldom exist in fruit growing districts this class of depositors is not in evidence, and bank conditions are not, therefore, as apt to be disturbed in fruit-growing districts as they are in cities. In the larger cities a great number of the depositors are of the laboring classes, mechanics and workingmen, whose comprehension of business and credit is more or less limited, for the reason that, outside of drawing their week's wage, paying their bills, and depositing what remains unspent, they have little knowledge of business.

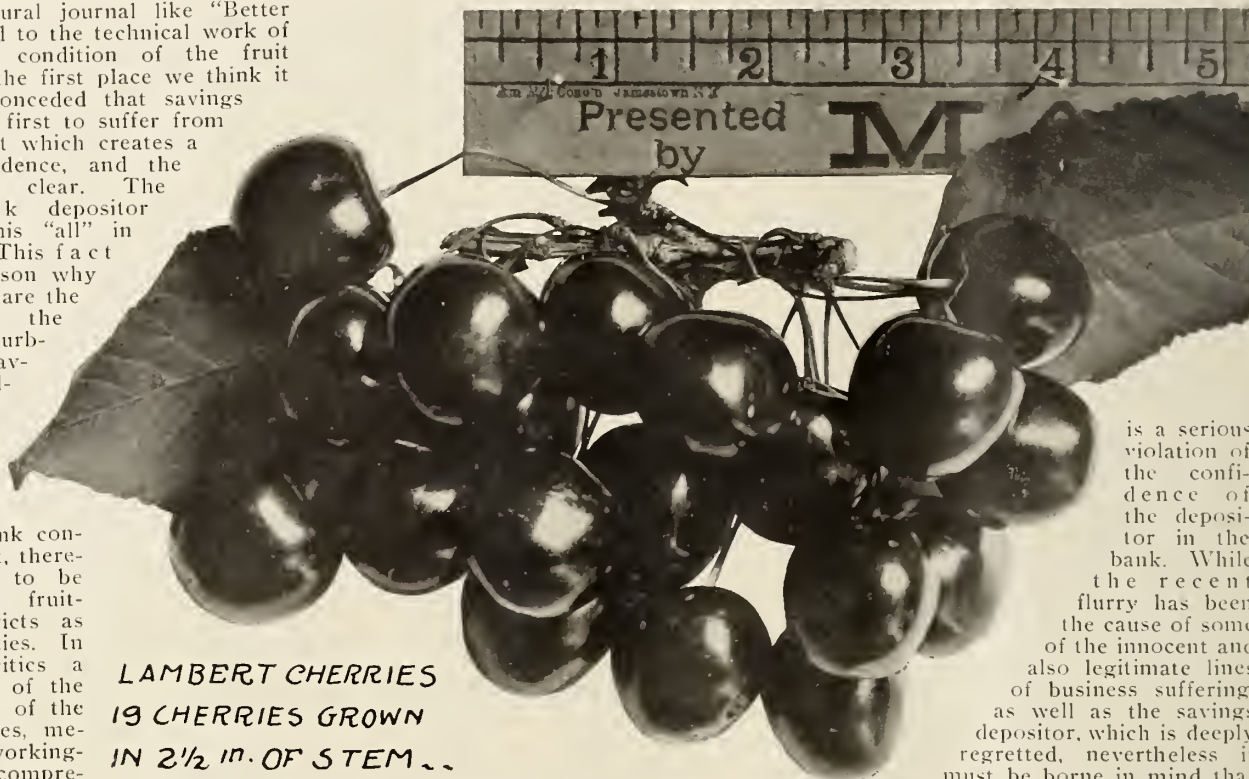
In a fruit section every grower is both a buyer and a seller, to a greater or less extent, and therefore has a broader comprehension of business and credit than the workingman and mechanic of the city. In addition to this must be taken into consideration the temperament of the two above classes of depositors. The fruit grower leads a life of contentment and one of independence in connection with his outdoor life, which tends to composure, and is naturally far less excitable than the city depositor, who lives in an atmosphere of rush. And it must also be taken into consideration that the fruit grower is in a different position from the average city depositor, inasmuch as he owns his place, which affords him a living even in times of money stringency, while the city depositor is largely dependent on others.

There is also another important feature to be taken into consideration along this line. Fruit growers as a rule are a very intelligent people and in some districts as high as ninety per cent are composed of educated men who have either been professional or business men in large cities, and consequently have a broader conception of business, banking and

credit. As a result, the banker in the fruit district has a feeling of confidence in his depositors, and this feeling being justified, it is but natural that the depositor will have confidence in his banker. With confidence on both sides, there can be no financial disturbance in banking circles in fruit growing districts.

We have observed conditions very closely in Hood River and believe other fruit districts are more or less the same, and our observations have prompted the above article. We believe, therefore,

—and loaned the money of its depositors on promotion development schemes and big stock deals, than those in New York. These big stock deals are nothing more nor less than gambling. Lending money on such deals, dependent upon the success of the scheme or the promotion, is almost equivalent to lending money to the gambler to play faro. If he wins you get your money back, and if he loses you don't. It seems to us that when a bank loans the money of its depositors to a promotion scheme in South Africa it



LAMBERT CHERRIES
19 CHERRIES GROWN
IN 2 1/2 IN. OF STEM...

BUNCH OF THE FINE CHERRIES GROWN AT THE DALLES, OREGON

that we are justified in the above conclusions, for the reason that during the financial flurry there has been absolute confidence by the banks of Hood River in their depositors, and an equal confidence by the depositors in the banks.

THERE are two kinds of banking. The conservative commercial banking of the old-time school and promotion banking of the get-rich-quick style.

The conservative bank loans its money to legitimate business and conservative business men and on first-class securities and properties to secure the loan. The borrower must have the confidence of the banker for integrity and ability and be able to convince the banker that his business is a legitimate one. Banks conducted on this principle have weathered the flurry and are in splendid financial condition at the present time, with a few unfortunate suspensions caused by heavy withdrawals, which were precipitated by false rumors or a lack of confidence created by previous suspensions of insolvent banking concerns.

Promotion banks have existed in New York, the financial center of America, for many years, and recently have spread over the entire country. In no place has banking gone more extensively into high finance—frenzied finance, we might say

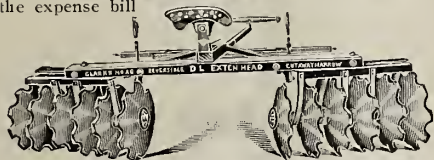
is a serious violation of the confidence of the depositor in the bank. While the recent flurry has been the cause of some of the innocent and also legitimate lines of business suffering, as well as the savings depositor, which is deeply regretted, nevertheless it must be borne in mind that the longer this day of reckoning had been postponed the greater would have been the damage. And if it had been postponed a few years, instead of a flurry we would have had a panic, hard times and disastrous losses generally. The result of the whole affair has been a few losses, more or less inconvenience, of course, all of which is offset a thousand times by the fact that the present indications point to a return of banking to legitimate, conservative methods.



DAMSON PLUMS AT HAZELWOOD

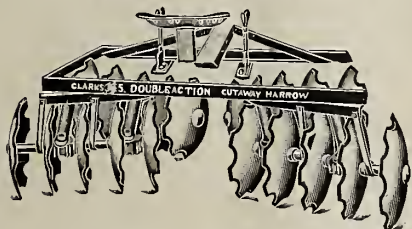
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Three-Horse Double Action (Extended), only disc harrow made that will do for irrigated orchards. Our Disc Plows and other Cutaway

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If you are up-to-date and want to keep posted on the good and valuable things for orchardists and fruit growers, send for my circulars

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O. R. DAUGHERTY, Agent
MOLALLA, OREGON

WHEN WRITING ADVERTISERS MENTION BETTER FRUIT

HOW TO GET HIGHER PRICES FOR PRODUCE

It is stated to be a fact by the Harvey Spring Company of Racine, Wisconsin, makers of the well-known Harvey Bolster Spring, that fruit buyers in particular offer 25 to 33 1-3 per cent more for fruit, potatoes, squashes, green corn and other produce of this kind when brought to market in a spring wagon than they would be willing to pay for the same produce hauled to market in the regular springless lumber wagon.

Mr. Harvey states that this fact, obtained direct from produce buyers,

wagon itself if not abused and overloaded. Besides this great advantage in making the farmer's crop more valuable to him, these springs have been found to possess other advantages which every farmer will readily appreciate. They make it possible to carry a heavier load without injury to the horses, because the "give" of the springs never makes it necessary to pull absolutely "dead weight," and by acting as a cushion between the load and the inequalities of the road, it is claimed that the life of any wagon is extended

many years when these springs are used. It also goes without saying that the wear and tear on the driver is practically eliminated in the same manner. It will be well worth the while of any reader of this publication, who is anxious to secure greater returns for farm and garden produce, to write to the Harvey Spring Company, of Racine, Wisconsin, for their catalog and for full particulars regarding an offer they have just put out to any reader of "Better



CHERRY ORCHARD IN BLOOM IN HAZELWOOD DISTRICT

was what induced him to perfect and place on the market his Bolster Spring, which turns any lumber wagon into a spring wagon in less than a minute and should last practically as long as the

Fruit" to use a pair of their springs on his wagon for thirty days, to prove to his satisfaction that the claims made for this valuable patented appliance are well-founded and not overdrawn.

WHAT ADVERTISERS SAY OF BETTER FRUIT

THAT our October number was equally as popular as the one preceding it can very easily be seen from the many testimonials received from nurserymen and others about it, and which we publish below. Read them and see what they think of "Better Fruit":

THE SIBSON ROSE NURSERIES
Growers and Importers of Fine Roses

Portland, Oregon, October 23, 1907.
Better Fruit Publishing Co., Hood River, Oregon:

It seems to us that you are filling your mission to fruit growers in a most satisfactory manner, and that they cannot fail to be benefited by the excellence of the periodical you are publishing in their interest. Very truly,

THE SIBSON ROSE NURSERIES,
William S. Sibson, Proprietor.

CALIFORNIA COMMISSION CO.

Seattle, Washington, October 22, 1907.
Better Fruit Publishing Co., Hood River, Oregon:

On receipt of the September number of your magazine "Better Fruit" we were very pleased to read the able manner in which Professor Lewis treated the subject of apple shipping. This sub-

ject is so completely discussed in all its branches that we think growers should not miss the opportunity it affords to give them points which are bound to be useful in successfully handling their fruit. Such subjects as apple packing, etc., discussed every month in your magazine will, we feel sure, be of great value to your numerous readers, and we certainly think you are entitled to every praise for your efforts "to strike the right nail on the head." Yours truly,

CALIFORNIA COMMISSION CO.

HANFORD NURSERIES

Oakesdale, Washington, October 21, 1907.
Better Fruit Publishing Co., Hood River, Oregon:

We congratulate you on the appearance of your October number, and hope you will succeed in getting a very liberal patronage. Yours very truly,

HANFORD NURSERIES.

THE WOODBURN NURSERIES

Woodburn, Oregon, October 24, 1907.
Better Fruit Publishing Co., Hood River, Oregon:

We take pleasure in acknowledging receipt of the October number. For makeup, both in newsy items and cuts, we think it is hard to beat; in fact, we know of no publication that has it excelled. You are doing an excellent work in the interest of the horticulturist, and we wish you every success. Complimenting you, we remain, yours truly
THE WOODBURN NURSERIES.

BETTER FRUIT HOOD RIVER, OREGON

OFFICIAL ORGAN OF THE NORTHWEST FRUIT
GROWERS ASSOCIATION

A MONTHLY ILLUSTRATED MAGAZINE PUBLISHED IN THE INTEREST OF UP-TO-DATE
PROGRESSIVE FRUIT-GROWING & MARKETING

ALL COMMUNICATIONS SHOULD BE ADDRESSED
AND REMITTANCES MADE PAYABLE TO THE
BETTER FRUIT PUBLISHING COMPANY

E. H. SHEPARD, EDITOR AND PUBLISHER
W. H. WALTON, ASSOCIATE EDITOR
CHRIS GREISEN SOLICITOR

SUBSCRIPTION PRICE \$1 PER YEAR
IN ADVANCE IN THE UNITED STATES & CANADA
FOREIGN SUBSCRIPTIONS, Including Postage, \$1.50
ADVERTISING RATES FURNISHED ON APPLICATION
Entered as second-class matter December 27, 1906,
at the post office at Hood River, Oregon, under
the act of Congress of March 3, 1879

WITH our current issue we extend the season's greetings to our many patrons and the world at large and wish them all "A Merry Christmas." Time is long, yet a year seems as a day, and although a glance backward tells us that, like the sinner, we have left undone many things that we ought to have done, and have done many things we ought not to have done, still we feel, thanks to our many friends, that we have made good progress. In this connection it gives us pleasure to state that our previous optimistic opinion of human kind has been strengthened during the past year many fold and in many ways. We have found that merit and honesty is appreciated; that there is always a helping hand for the one who is willing to help others; that the reading public wants the best and knows it when it sees it, and that it wants others to know it also. In the management of our publication we have departed to a considerable extent from the set rules of papers of this character and given our readers what we thought they wanted, and have been told so often that we are right that we are convinced that we have fairly, at least, fulfilled our mission. To do this we have had to have the support of the fruitgrower, the advertiser and the voluntary subscription worker, and we want to state we have had it most loyally. Not only have the above contributed of their worldly goods, but of their time, their kindly words of commendation, and have also taken a personal interest in bringing our paper to the attention of all classes interested. This has made it possible for us to make a better publication, extend its circulation and to help bring the fruit industry of the great Northwest to a prominence it never before commanded.

To all these, and others, we again say, "A Merry Christmas and many of 'em."

THE well-known authority on the culture of the English walnut, Mr. T. Withycombe, is so confident of the future for that nut in Oregon that he contemplates planting 1,000 acres of land suitable for that purpose in the near future. If you are thinking of planting walnuts write him for prices on stock.

NEVER before in the history of the fruit business in the Northwest has the same interest been shown in the care of orchards as during the past year. Of course, in some of the districts like Hood River, Southern Oregon, Yakima and Wenatchee, and a few others, very thor-

ough and efficient work has been done, for the reason that in those districts most orchardists are specialists. In many other districts orchardists are diversified farmers and have not given their orchards the same care.

We notice particularly an awakening in the Willamette Valley that is indeed commendable.

People who are troubled with anthracnose should have sprayed with Bordeaux mixture before this edition will be published. If they have not done so they should immediately give the matter attention. Where there is scale every orchardist should give two sprayings with lime and sulphur, one in the fall or winter and another in the spring.

The editor of "Better Fruit" believes not only in thorough work, but in doing it promptly and at the proper time, and in accordance with this idea sprayed his orchard thoroughly with Bordeaux mixture for anthracnose, as a preventive measure, the first week in November. Also he put on the winter spray of lime and sulphur, so that his winter spraying was done before the fall rains set in. The object in doing this is, first, that the anthracnose can be more effectively killed before the heavy fall rains begin, and it is a great deal easier to put on the winter sprays before the fall rains,

TAKE A SPECIAL COURSE

We have made arrangements with the Scranton Correspondence School to give away one of their scholarships. By consulting their advertisement on another page you will find a long list of the various courses. Pick out the one you want and send us the most subscribers by February 1 and we will send you the right to a scholarship FREE. Write us and commence at once. Address Better Fruit Publishing Company, Hood River, Oregon.

for the reason that after they do set in it is not only difficult but disagreeable to pull the spray outfit through mud.

There are several commercial makes of lime and sulphur, all of which are very popular and effective. The editor knows of three trees affected with scale to such an extent last year that only twelve boxes of apples out of thirty were free from this disease. These trees were sprayed this spring with lime and sulphur made by the Oregon Gas and Spray Company, and when the crop was harvested not a scaly apple was found. The official inspection made by the inspector failed to find a single scale on any of the trees. We believe all the prepared sprays are good, and we believe also that the home-made mixture, if properly made, will do effective work.

IN the Year Book recently issued by the United States Agricultural Department is a section devoted to a series of articles by William A. Taylor, pomologist in charge of field investigations, under the title, "Promising New Fruits." Among the new fruits that Mr. Taylor writes of are three varieties of apples, the Early Wheeler peach, the Banner grape, the persimmon, the avocado and the pecan. All are beautifully illustrated in colors, and the letterpress, as is usual with Mr. Taylor, is devoid of useless verbiage and to the point. Later it is

our purpose to publish these articles, which are not only interesting but valuable in showing what can be done in developing some fruits that have heretofore been considered of very uncertain commercial value.

WHERE Flows Hood River, a book of illustrated verse by Marion Cook, with photographs and drawings by the author, has come to us, and with it the warm breath of summer. As its title indicates, its inspirations are the beautiful scenes in and about Hood River Valley and city. One has but to scan the lines to know that the author is a nature-lover and is intimately acquainted with every spot of which she writes. The illustrations are admirable, being artistic both in treatment and selection, but better still is the verse, as Miss Cook tells of "Where Flows Hood River" in simple, rippling language that wins the appreciation of the reader to the beauties of nature. While the book is largely local in color, it is at the same time one that ought to interest the average reader, but should particularly appeal to those who know of or live in the Hood River Valley. Uniquely bound, printed on heavy calendered paper, with initials illuminated, and a miniature strawberry in colors underneath the title on the alternate pages, the volume constitutes a most attractive Christmas gift. It has been placed on sale in local and Portland book stores and is meeting with deserved approval and success.

ON another page will be found the announcement of E. G. Mendenhall, of Kimmunity, Illinois, general agent for Clark's Cutaway Orchard and Farm Tools. This make of tools is one of the best and also one of the most extensive lines of orchard implements on the market. The orchardist seeking proper tools for cultivation will do well to consult Mr. Mendenhall's advertisement or write him.

Almost the whole world knows of Hood River as a place that produces the best fruits, and all of Hood River Valley should know, and could know, that there is one place in Hood River, under the firm name of R. B. Bragg & Co., that the people can depend on getting the most reliable dry goods, clothing, shoes and groceries at the most reasonable prices that are possible; try it.

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The Rogue River Valley,
"The Italy of America"

TOKAY GRAPES

The Finest in the World
Soil and Climate Unsurpassed

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REALTY CO.

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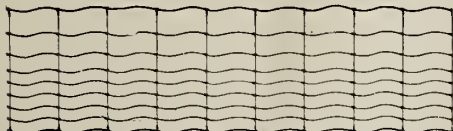
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E. ESTES Manager of Distributary
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We have the soil and the climate.
Years of experience have given
us the knowledge. Therefore we
can give you the best nursery stock
that can be grown. Give us a trial
and be convinced. Catalogue free

SALESMEN WANTED

CHICO NURSERY CO.
CHICO, CALIFORNIA

Best 40 Acres on Earth

Put your money where it is safe, in Kennewick, Finley Valley. Buy this forty acres put it in alfalfa (and cows) and get a net return from creamery of \$1000 a month. Price of land \$75 per acre; leveling, seeding, etc., about \$25 per acre. This is a snap, come at once, as we only have eighty acres at this price.

N. B.—We never have mud or snow, so you can see our lands any day of the winter and enjoy the free ride.

Blacksmith wanted. Easy terms a home to suit that pays a fortune yearly. Free list of 3000 acres.

HANSON & RICH
LARGEST LAND DEALERS
KENNEWICK, WASHINGTON

BERRY PLANTS

OVER FORTY VARIETIES OF
STRAWBERRIES, RASPBERRIES,
BLACKBERRIES, PHENOMENALS,
LOGANS, CURRANTS, VICTORIAS,
MAMMOTHS, DEWBERRIES, ETC.

J. O. HOLT EUGENE,
OREGON

SEND FOR PRICE LIST

IT has always been our object to have our front cover original and beautiful, and also to have it convey some object lesson at the same time.

The cover design of labels on the front page of our November issue is perhaps the most unique and original of any we have published, and it is but natural, therefore, that we feel pleased over the many compliments we are receiving about it.

The cover told its own story in an educational way, briefly and to the point. No one could see it without realizing the importance to every district, every association and firm, of using a handsome label on all fruit. A label adds to the attractiveness of the package, which means a better price. It also advertises the state, the district and the shipper. Perhaps equally as important, if not more so, is the fact that the label itself must mean a guaranteed standard pack, which

not only creates a better price, but at the same time establishes that better price.

The labels reproduced on our cover page were made by the Schmidt Lithograph Company, of Portland, Oregon, of which Mr. E. Shelley Morgan is manager, and we are indebted to him for their artistic arrangement. It is not necessary for us to say that they are as fine work of this kind as can be done anywhere, as one has but to see them to know this. The Schmidt Lithograph Company should be patronized, as it is virtually a home industry, and by producing such handsome labels is largely helping the fruit industry of the great Northwest.

BETTER FRUIT has the confidence of every grower, every subscriber, every reader, and it is so going to conduct itself as to continue to merit it.

PERSONAL PARAGRAPHS ABOUT FRUIT GROWERS

THE well known manager of the Wenatchee Fruit Growers' Association, E. T. Balch, was at Hood River during the month. Mr. Balch tells us that Wenatchee had a most successful season this year and that it is a question of but a short time when the output from there and the adjoining districts will be doubled. In addition to Wenatchee and Cashmere, the Lake Chelan, Methow and other districts are fast developing, and once the transportation problem is solved many hundreds of fertile acres there will bloom with orchards. We also learned from Mr. Balch that the plan of selling their apples by sealed bids, which was adopted by the association this year for the first time, was very successful, and higher prices were realized than in any previous year. Like others, Mr. Balch was here to observe Hood River methods, and showed himself to be a painstaking and intelligent observer.

F. M. Palmer, interested in fruit growing in British Columbia, spent a week at Hood River during the recent packing and shipping season. We learned from Mr. Palmer that strawberries as well as apples are grown very profitably in his district and that our neighbors across the line are fully alive to anything new in the matter of bettering fruit-raising conditions. He tells us also that most of the implements for cultivating are obtained from the United States, and that many other things necessary to the fruit grower would be bought here were it not for the high duty. Some of these articles are not manufactured in British Columbia, such as spray materials, which they find cheaper to make themselves than to import prepared, due to the fact already stated. For labor the British Columbia grower has somewhat the best of it over his fellow worker in the States,

as he is able to get the cheaper and efficient Chinaman. It is gratifying to know, through Mr. Palmer, that our Canadian brothers are a unit with growers in the Northwestern states in the matter of clean fruit and better pack and that they are ready to co-operate in any way possible to secure the best results along this line.

Mrs. Marion MacRae, of Portland, for several years connected with the Oregonian, and well known as a newspaper writer throughout the Northwest, is developing a fruit ranch at Hood River, and told us in a recent visit that she hopes to set it to trees in the spring. Mrs. MacRae is an indefatigable worker and also an enthusiast in regard to the possibilities of the fruit business, particularly at Hood River, and her pen is ever ready in support of it. She is at present connected with Western Life, in connection with other interests, and it is very probable that that publication will soon be heard of through her efforts to present some of the newer features of the fruit industry.

John L. Wilson, proprietor of the Centerville Nursery, at Centerville, Iowa, wanted to know how they did it in the Northwest, and recently visited Hood River to find out. Mr. Wilson informs us that the name of Hood River is as well known in Iowa as almost any town in that state, and that its apples and strawberries are synonymous with standard in quality. It is also discovered through him that fruit growers there had a successful year. The rigorous winter climate in Iowa is not, according to Mr. Wilson, as advantageous to the fruit business as it might be and is turning the steps of a good many from that great agricultural state toward the Northwest.

ORENCO IS VALUABLE AS A DESSERT APPLE

THE Orenco apple, which is the subject for our front cover page this month, is a new dessert apple that is receiving a good deal of attention at the hands of growers and horticulturists. It is described by the Oregon Nursery Company, of Salem, Oregon, which believes it to be a most superior apple, as follows:

"The Orenco apple is full red, overspread with numerous light-colored dots. Flesh crisp, tender and juicy, with a very small core. Flavor mild subacid, with a pleasing aroma. Season, November to May. Tree hardy, vigorous and

productive. Superior to McIntosh Red or Spitzenberg as a dessert apple."

As to its superiority to the Spitzenberg we cannot say, as our knowledge of the Orenco is somewhat limited. We have, however, thorough confidence in the judgment of the Oregon Nursery Company in the matter and the samples we have seen show an apple of remarkably fine quality, color and texture. Its uniform shape also adds to its attractiveness, and the outlook for its large propagation seems bright. The Oregon Nursery Company has issued a four-page circular descriptive of the Orenco, which can be had by writing them.

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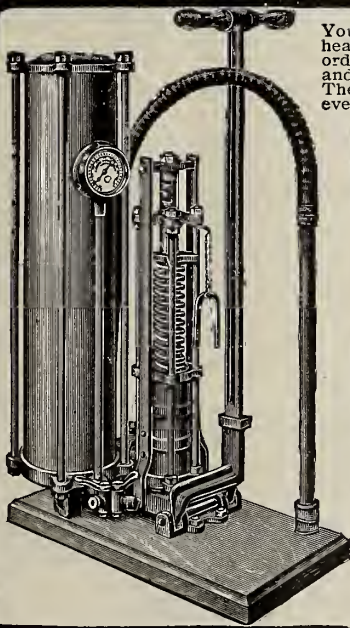
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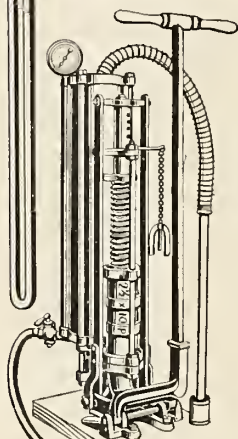
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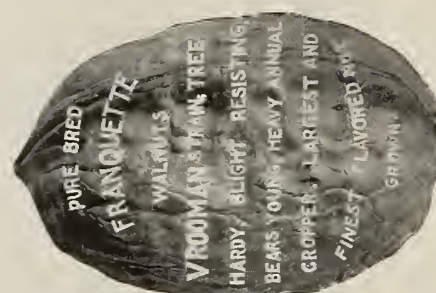
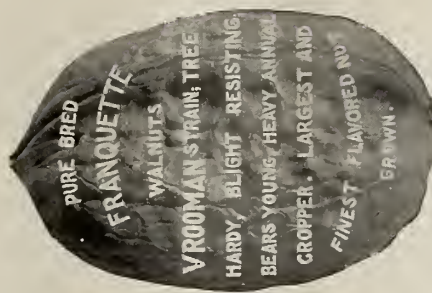
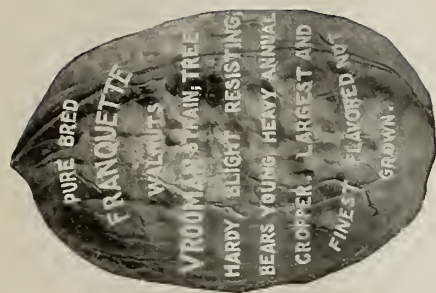
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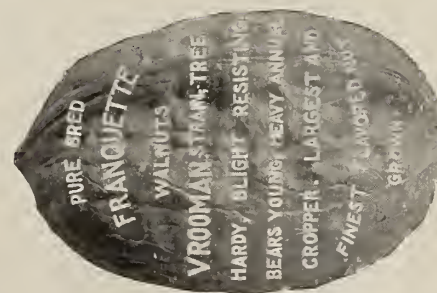
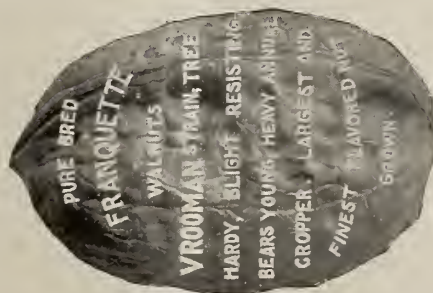
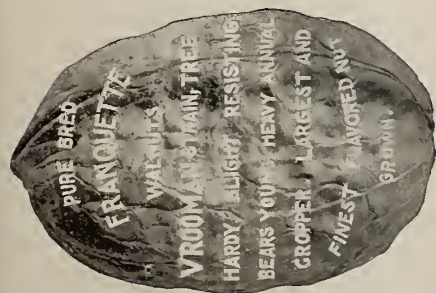
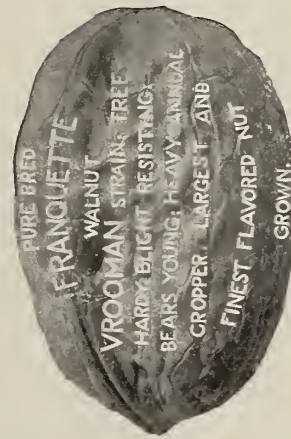
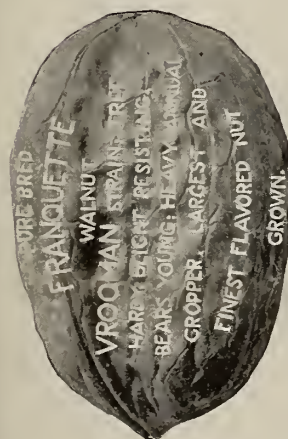
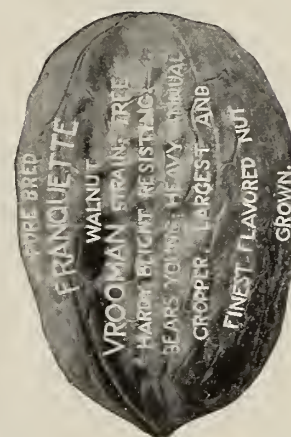
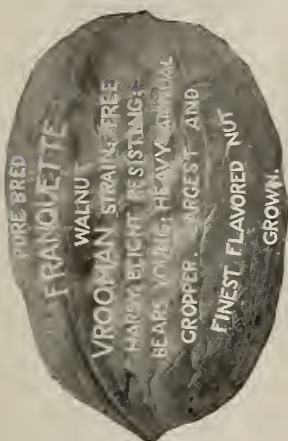
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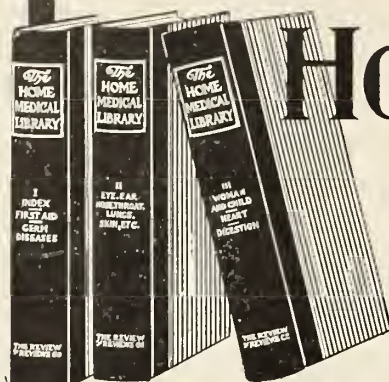
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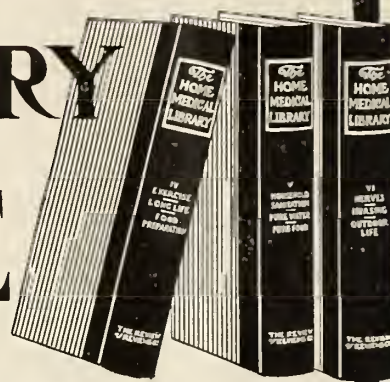
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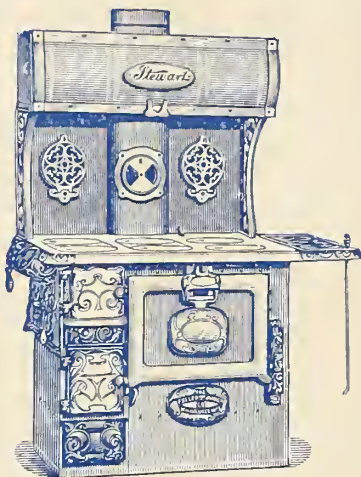
To Fruit Buyers and Sellers: Having been manager of the Hood River Fruit Growers Union for the past four years, and the Hood River Apple Growers Union for the past three years, I feel that I am doing you a favor when I say that I consider the Produce Reporter Credit Book and Weekly Sheet of inestimable value. E. H. SHEPARD, Editor and Publisher of Better Fruit.

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We are agents for the Famous 'Stewart' Ranges, which are made in different grades, but one quality, and are guaranteed absolutely against defect in material, workmanship and operation

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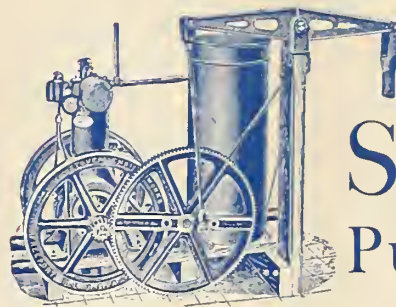


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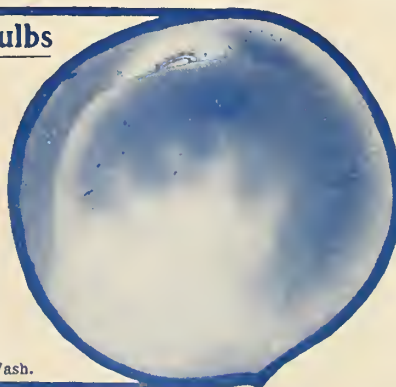
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